Reference Room

PART II

FEDERAL REGISTER

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TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

[CGFR 52-43]

VESSEL INSPECTION

REVISION OF CHAPTER

Part II of this issue contains a revision of the vessel inspection regulations of the United States Coast Guard, Department of the Treasury.

The President by proclamation dated September 10, 1952, proclaimed that the International Convention for the Safety of Life at Sea, 1948, shall come into force and effect on and after November 19, 1952, and that this Convention, with each and every article and clause thereof, shall be observed and fulfilled with good faith by the United States of America and by the citizens of the United States of America and all other persons subject to the jurisdiction thereof. The requirements which apply to the operation of vessels engaged on international voyages will be in effect on and after November 19, 1952. It is recognized that the inspection and issuance of required certificates for all vessels on November 19, 1952, cannot be accomplished. Therefore, in order to have an orderly administration of the requirements of this Convention which deals with new equipment required or new certificates issued will have to be done during the year from November 19, 1952, to November 19, 1953. When the various vessels come up for their regular annual or initial inspection, the new requirements of the Convention will be applied insofar as they concern equipment or construction so that all vessels will be in compliance with the new requirements by November 19, 1953.

The requirements in Chapter I of 46 CFR implement and complement the 1948 Convention insofar as they apply to vessels engaged on international voyages. In connection with new equipment required by the regulations, it is not intended that penalties will be assessed for failure to have such equipment during the interim between November 19, 1952, and the date of the vessel's next annual inspection. In the revision of the regulations and their application to existing vessels, it is not intended that "major conversions" will be required to be made. The requirements while written primarily for new vessels, will be applied to existing vessels only insofar as it is practicable and reasonable. Where certain new items of equipment are required by the 1948 Convention which will not be available on November 19, 1952, it is not intended that a vessel shall be delayed in sailing because of the lack of this equipment, and in such cases an additional reasonable time will be given to comply with the requirements if such action will not materially affect the safety of the vessel. For existing vessels not engaged in international voyages the revision of the regulations by this document should not materially affect their operation.

On November 19, 1951, the fifteenth country deposited its ratification of the 1948 Convention for Safety of Life at Sea with the British Government. Therefore, the requirements contained in this Convention will come into force on November 19, 1952, insofar as the United States is concerned. The United States Coast Guard is one of the primary Governmental agencies concerned with the administration of this Convention and the Commandant is charged with promulgating necessary vessel inspection regulations to give force and effect to the Convention. In order to have the regulations published in such a manner that persons and organizations affected thereby will be able to understand the requirements applicable to them, as required by the Administrative Procedure Act, the style and format of the regulations in Chapter I, Title 46, CFR, are revised or rearranged so that regulations are grouped by types of vessels or by subjects. Because of the scope and extent of this revision, it was necessary to postpone the publishing of certain revised marine engineering regulations considered by the Merchant Marine Council at a public hearing held September 18, 1951.

The notices of proposed rule making and announcements of public hearings to be held by the Merchant Marine Council were published in the Federal Registers dated August 16, 1951 (16 F. R. 8136–8139), February 27, 1952 (17 F. R. 1727–1731), and June 24, 1952 (17 F. R. 5665–5673). The Merchant Marine Council held public hearings in Washington, D. C., on September 18, 1951, March 25, 1952, and July 22, 1952. All the comments, views, and data submitted either in writing or orally at the public hearings were considered and, where practicable, were incorporated into the regulations.

The purpose of the amendments to the regulations contained in this document is: (a) to provide new or revised requirements to implement or complement the 1948 Convention for Safety of Life at Sea; (b) to review and bring up to date the requirements for vessel inspection; (c) to revise the style and format of regulations to have a better presentation of requirements; and (d) to describe present practices and procedures more fully in order to provide a better arrangement and understanding of the requirements.

In revising and rearranging the regulations the requirements are set forth by general subjects or by types of vessels. In each subchapter there is set forth the application of the regulations. It was not necessary to amend or revise or renumber all the regulations in Chapter I. Therefore, those regulations which are not affected by this document have not been included. In order to understand the effect of the reorganization of material, Table I lists the revised subchapter and part titles for Chapter I. The comments describe the action taken.

TABLE I—SUBCHAPTER AND PART HEADINGS FOR CHAPTER I WITH COMMENTS

Part No.	Subchapter designation	Title	Action taken
----	A	Procedures Applicable to the Public	Editorial revisions made to agree with revised regulations.
1	A	General Course and Methods	No change made.
2	A	Vessel Inspections	Part rewritten to agree with revised regulations.
3	A	Merchant Marine Personnel	Part editorially revised to agree with changes made in regulations.
4	A	Investigations and Hearings	No change made.
----	B	Merchant Marine Officers and Seamen	No change made in existing requirements.
10	B	Licensing of Officers and Motorboat Operators and Registration of Staff Officers.	No change made.
12	B	Certification of Seamen	Do.
14	B	Shipment and Discharge of Seamen	Do.
15	B	Allotments of Seamen	Do.
16	B	United States Shipping Commissioners	Part 134 editorially revised and renumbered.
----	C	Uninspected Vessels	Vol. III, Items XVIII–XX of public hearing held July 22, 1952 (17 F. R. 5669). These requirements apply to motorboats and uninspected vessels formerly published in Parts 24 to 28.
24	C	General Provisions	Item XVIII of public hearing held July 22, 1952. Part completely revised.
25	C	Requirements	Item XIX of public hearing held July 22, 1952. Part completely revised.
26	C	Operations	Item XX of public hearing held July 22, 1952. Part completely revised.
----	D	Tank Vessels	Requirements revised to implement the 1948 Convention for Safety of Life at Sea, as well as other changes necessary for revising requirements. Items V–XI of public hearing held Mar. 25, 1952 (17 F. R. 1728, 1729).
30	D	General Provisions	Item V of public hearing held Mar. 25, 1952. Minor revisions regarding application of requirements.
31	D	Inspection and Certification	Item VI of public hearing held Mar. 25, 1952. Revision of various sections.
32	D	Special Equipment, Machinery, and Hull Requirements.	Item VII of public hearing held Mar. 25, 1952. Item XXV of public hearing held July 22, 1952 (17 F. R. 5671). Revision of various sections.
33	D	Lifesaving Appliances	Item VIII of public hearing held Mar. 25, 1952. Revision of various sections.
34	D	Fire-Fighting Equipment	Item IX of public hearing held Mar. 25, 1952. Revision of part.
35	D	Operations	Item X of public hearing held Mar. 25, 1952. Revision of various sections.
38	D	Liquefied Petroleum Gases	Item XI of public hearing held Mar. 25, 1952. Volume V, Item XXV of public hearing held July 22, 1952 (17 F. R. 5671). Revision of various sections.
39	D	Inflammable or Combustible Liquids Having Lethal Characteristics.	No change made.
----	E	Load Lines	Editorial renumbering of requirements.
43	E	Foreign or Coastwise Voyage	Item XIX of public hearing held Mar. 25, 1952 (17 F. R. 1730). Revision of various sections and editorial renumbering of part.
44	E	Variance for Steam Colliers, Tugs, Barges, and Self-Propelled Barges.	Editorial renumbering of part. Editorial changes regarding application and authority.
45	E	Merchant Vessels When Engaged in a Voyage on the Great Lakes.	Editorial changes regarding applicability and authority. Editorial renumbering of part.
46	E	Subdivision Load Lines for Passenger Vessels.	Vol. VII, Item XXXI of public hearing held July 22, 1952 (17 F. R. 5672). Revision of part.
----	F	Marine Engineering	Miscellaneous changes were considered at public hearings held Sept. 18, 1951, Mar. 25, 1952, and July 22, 1952. Miscellaneous changes and revisions of certain parts.
50	F	General Provisions	Item I of public hearing held Sept. 18, 1951 (16 F. R. 8136). Revision of part.
51	F	Materials	No change made. (Part republished in FEDERAL REGISTER Aug. 21, 1952 (17 F. R. 7628–7633).)
52	F	Construction	Item III of public hearing held Sept. 18, 1951 (16 F. R. 8137). Item XIII of public hearing held Mar. 25, 1952 (17 F. R. 1729). Vol. V, Item XXVI of public hearing held July 22, 1952 (17 F. R. 5671). Miscellaneous revision of various sections.
53	F	Low Pressure Heating Boilers	Item IV of public hearing held Sept. 18, 1951 (16 F. R. 8137). Vol. V, Item XXVI of public hearing held July 22, 1952 (17 F. R. 5671). Revision of various sections.
54	F	Unfired Pressure Vessels	Item V of public hearing held Sept. 18, 1951 (16 F. R. 8137). Revision of various sections.

TABLE I—SUBCHAPTER AND PART HEADINGS FOR CHAPTER I WITH COMMENTS—Continued

Part No.	Subchapter designation	Title	Action taken
55	F	Piping Systems, Pumps, Refrigeration Machinery, and Fuel Tanks.	Item VI of public hearing held Sept. 18, 1951 (16 F. R. 8137). Item XIII of public hearing held March 25, 1952 (17 F. R. 1729). Vol. V, Item XXVII of public hearing held July 22, 1952 (17 F. R. 5671). Revision of various sections.
56	F	Arc Welding, Gas Welding, and Brazing	Item VII of public hearing held Sept. 18, 1951 (16 F. R. 8138). Volume V, Item XXVII of public hearing held July 22, 1952 (17 F. R. 5671). Revision of various sections.
57	F	Main and Auxiliary Machinery	Item VIII of public hearing held Sept. 18, 1951 (16 F. R. 8138). Vol. V, Item XXVIII of public hearing held July 22, 1952 (17 F. R. 5671). Revision of part.
58	F	Repairs to Boilers, Unfired Pressure Vessels, and Appurtenances.	Do.
59	F	Independent Internal Combustion Engine Fuel Tanks.	Vol. V, Item XXVIII of public hearing held July 22, 1952 (17 F. R. 5671, 5672). Revision of part.
61	F	Installations, Tests, Inspections, Markings, and Official Forms.	Item VIII of public hearing held Sept. 18, 1951 (16 F. R. 8138). Volume V, Item XXVIII of public hearing held July 22, 1952 (17 F. R. 5671, 5672). Revision of part.
----	G	Marine Engineering Installations Contracted for Prior to July 1, 1935.	Items XIV–XVII of public hearing held Mar. 25, 1952 (17 F. R. 1730). Text of old Part 58 revised and renumbered.
66	G	General	Item XV of public hearing held Mar. 25, 1952 (17 F. R. 1730). New part added.
67	G	Construction	Do.
68	G	Piping Systems	Item XVI of public hearing held Mar. 25, 1952 (17 F. R. 1730). New part added.
69	G	Installations, Tests, Inspections, and Repairs.	Item XVII of public hearing held Mar. 25, 1952 (17 F. R. 1730). New part added.
----	H	Passenger Vessels	Vol. I, Items I–IX of public hearing held July 22, 1952 (17 F. R. 5666–5668). Revision and rearrangement of applicable requirements (old Parts 76–83 canceled).
70	H	General Provisions	Vol. I, Item I of public hearing held July 22, 1952 (17 F. R. 5666). New part added.
71	H	Inspection and Certification	Vol. I, Item II of public hearing held July 22, 1952 (17 F. R. 5666). New part added.
72	H	Construction and Arrangement	Vol. I, Item III of public hearing held July 22, 1952 (17 F. R. 5666). New part added.
73	H	Watertight Subdivision	Vol. I, Item IV of public hearing held July 22, 1952 (17 F. R. 5666). New part added.
74	H	Stability	Vol. I, Item V of public hearing held July 22, 1952 (17 F. R. 5667). New part added.
75	H	Lifesaving Equipment	Vol. I, Item VI of public hearing held July 22, 1952 (17 F. R. 5667). New part added.
76	H	Fire Protection Equipment	Vol. I, Item VII of public hearing held July 22, 1952 (17 F. R. 5667). New part added (text of old Part 76 canceled).
77	H	Vessel Control and Miscellaneous Systems and Equipment.	Vol. I, Item VIII of public hearing held July 22, 1952 (17 F. R. 5667). New part added (text of old Part 77 canceled).
78	H	Operations	Vol. I, Item IX of public hearing held July 22, 1952 (17 F. R. 5667). New part added (text of old Part 78 canceled).
----	I	Cargo and Miscellaneous Vessels	Vol. II, Items X–XVII of public hearing held July 22, 1952 (17 F. R. 5668, 5669). Revision of applicable requirements and rearrangement of material. (Old Parts 94–102 canceled).
90	I	General Provisions	Vol. II, Item X of public hearing held July 22, 1952 (17 F. R. 5668). New part added.
91	I	Inspection and certification	Vol. II, Item XI of public hearing held July 22, 1952 (17 F. R. 5668). New part added.
92	I	Construction and arrangement	Vol. II, Item XII of public hearing held July 22, 1952 (17 F. R. 5668). New part added.
93	I	Stability	Vol. II, Item XIII of public hearing held July 22, 1952 (17 F. R. 5668). New part added.
94	I	Lifesaving Equipment	Vol. II, Item XIV of public hearing held July 22, 1952 (17 F. R. 5668). New part added (text of old Part 94 canceled).
95	I	Fire Protection Equipment	Vol. II, Item XV of public hearing held July 22, 1952 (17 F. R. 5669). New part added (text of old Part 95 canceled).
96	I	Vessel Control and Miscellaneous Systems and Equipment.	Vol. II, Item XVI of public hearing held July 22, 1952 (17 F. R. 5669). New part added (text of old Part 96 canceled).

TABLE I—SUBCHAPTER AND PART HEADINGS FOR CHAPTER I WITH COMMENTS—Continued

Part No.	Subchapter designation	Title	Action taken
97	I	Operations	Vol. II, Item XVII of public hearing held July 22, 1952 (17 F. R. 5669). New part added (text of old Part 97 canceled).
.....	J	Electrical Engineering	Vol. IV, Items XXI–XXIV of public hearing held July 22, 1952 (17 F. R. 5670, 5671) New regulations added (old Parts 113–120 canceled).
110	J	General Provisions	Vol. IV, Item XXI of public hearing held July 22, 1952 (17 F. R. 5670). New part added.
111	J	Electrical System, General Requirements	Vol. IV, Item XXII of public hearing held July 22, 1952 (17 F. R. 5670). New part added.
112	J	Emergency Lighting and Power System	Vol. IV, Item XXIII of public hearing held July 22, 1952 (17 F. R. 5670). New part added.
113	J	Communication and Alarm Systems and Equipment.	Vol. IV, Item XXIV of public hearing held July 22, 1952 (17 F. R. 5670). New part added (text of old Part 113 canceled).
.....	K	Marine Investigations and Suspension and Revocation Proceedings.	Change in subchapter title. (Old Parts 131, 133, 134, 135, 140, 141 canceled.)
136	K	Marine Investigation Regulations	Editorial changes in various sections to agree with changes made in other parts of chapter.
137	K	Suspension and Revocation Proceedings	No change made.
.....	L	Overtime Services	Do.
143	L	Extra Compensation for Overtime Services.	Do.
.....	M	Bulk Grain Cargo	New requirements added to implement the 1948 Convention for Safety of Life at Sea.
144	M	Loading and Stowage of Grain Cargoes	Vol. VI, Item XXX of agenda of public hearing held July 22, 1952 (17 F. R. 5672). New part added (text of old Part 144 canceled).
.....	N	Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels.	No change made. (The text of various revisions published in separate FEDERAL REGISTER documents.)
146	N	Transportation or Storage of Explosives or Other Dangerous Articles or Substances, and Combustible Liquids on Board Vessels.	No change made.
147	N	Regulations Governing the Use of Dangerous Articles as Ships' Stores and Supplies on Board Vessels	Do.
.....	O	Regulations Applicable to Certain Vessels During Emergency.	Do.
154	O	Waivers of Navigation and Vessel Inspection Laws.	Do.
.....	P	Manning of Vessels	Vol. VIII, Item XXXII of public hearing held July 22, 1952 (17 F. R. 5672). New subchapter containing manning requirements previously published in various sections and parts throughout chapter.
157	P	Manning Requirements	New part added. This part contains requirements previously published as Parts 131, 135, 140, 141 (the text of old Part 157 canceled).
.....	Q	Specifications	Vol. V, Item XXIX of public hearing held July 22, 1952 (17 F. R. 5672). New specifications added.
160	Q	Lifesaving Equipment	No change made.
161	Q	Electrical Equipment	No change made.
162	Q	Engineering Equipment	New subparts (specifications) added.
163	Q	Construction	No change made.
164	Q	Materials	Do.
.....	R	Nautical Schools	Editorial rearrangement of requirements and editorial changes to agree with other changes made in chapter.
166	R	Designation and Approval of Nautical School Ships.	Editorial rearrangement and renumbering of requirements. Minor changes made in regulations. New part added. (The text of old §§ 133.0 to 133.4 transferred to this part.)
167	R	Public Nautical School Ships	Editorial changes made to agree with other changes made in chapter.
168	R	Civilian Nautical School Ships	Editorial rearrangement and renumbering of requirements. (The text of old §§ 138.5 to 133.18 transferred to this part.)
.....	S	Numbering Undocumented Vessels	Item XX of public hearing held Mar. 25, 1952 (17 F. R. 1731).
172	S	Numbering Requirements	New part added (text of old Part 29 revised, renumbered and transferred to this part).

In order to understand the transfer and rearrangement of requirements as applied to regulations previously published in Chapter I, the following changes were made:

Subchapter A—Procedures Applicable to the Public

No change made in the arrangement of material. Revisions were made in the text of Parts 2 and 3 to agree with changes made in other parts of this chapter.

Subchapter B—Merchant Marine Officers and Seamen

No change made in the arrangement of material. A new Part 16, regarding United States Shipping Commissioners, is added. The text of this part was previously published as Part 133 in Subchapter K.

Subchapter C—Motorboats, and Certain Vessels Propelled by Machinery Other Than by Steam More Than 65 Feet in Length

This subchapter, consisting of Parts 24 to 29, is canceled. The text of Parts 24 to 28 was revised so that it would apply only to uninspected vessels (primarily motorboats) and republished as Parts 24, 25, and 26. The text of Parts 24 to 28, applicable to passenger vessels, is transferred to a new Subchapter H. The text of Parts 24 to 28, applicable to cargo and miscellaneous vessels, is transferred to a new Subchapter I. The text of Parts 24 to 28, relating to marine engineering, is transferred to Subchapter F. The text of Part 29, regarding numbering of undocumented vessels, is revised and transferred to a new Part 172 in a new Subchapter S.

Subchapter D—Tank Vessels

No change made in the arrangement of material. Part 34, regarding firefighting equipment, is revised. Various sections in other parts are revised to implement the 1948 Convention for the Safety of Life at Sea, or to transfer requirements regarding marine engineering, or specifications to Subchapter F, or Subchapter Q, respectively.

Subchapter E—Load Lines

This subchapter, consisting of Parts 43 to 46, is completely renumbered and the text of Part 46, regarding subdivision of passenger vessels, revised. Certain requirements in Parts 43 to 46, dealing with marine engineering, were transferred to Subchapter F. Certain requirements, regarding stability and subdivision of passenger vessels, were transferred to Subchapter H. The changes made in Parts 43 to 45 are primarily editorial and agree with changes made in other parts of this chapter.

Subchapter F—Marine Engineering

This subchapter, consisting of Parts 50 to 58, is revised so that it will contain only the requirements applicable to marine engineering installations and equipment contracted for on or after July 1, 1935. Part 50 is completely revised and renumbered. Various sections in Parts 52 to 56 are revised. Part 57 is completely revised and requirements renumbered as Parts 57, 58, 59, and 61, in order to have a better presentation of requirements. The text of Part 58, as well as applicable requirements from Parts 50 to 57, which apply to marine engineering installations contracted for prior to July 1, 1935, are transferred to new Parts 66 to 69 in a new Subchapter G.

Subchapter G—Ocean and Coastwise; General Rules and Regulations

This subchapter, consisting of Parts 59 to 65, is canceled. The requirements applicable to passenger vessels are revised and transferred to a new Subchapter H. The requirements applicable to cargo and miscellaneous vessels are revised and transferred to a new Subchapter I. The requirements regarding marine engineering are revised and transferred to Subchapter F. The requirements regarding manning of vessels are revised and transferred to a new Subchapter P.

Subchapter H—Great Lakes; General Rules and Regulations

This subchapter, consisting of Parts 76 to 83, is canceled. The requirements applicable to passenger vessels are transferred to a new Subchapter H. The requirements applicable to cargo and miscellaneous vessels are transferred to a new Subchapter I. The requirements regarding marine engineering are transferred to Subchapter F. The requirements regarding manning of vessels are transferred to a new Subchapter P.

Subchapter I—Bays, Sounds, and Lakes Other Than the Great Lakes; General Rules and Regulations

This subchapter, consisting of Parts 94 to 102, is canceled. The requirements

applicable to passenger vessels are transferred to a new Subchapter H. The requirements applicable to cargo and miscellaneous vessels are transferred to a new Subchapter I. The requirements regarding marine engineering are transferred to Subchapter F. The requirements regarding manning of vessels are transferred to a new Subchapter P.

Subchapter J—Rivers; General Rules and Regulations

This subchapter, consisting of Parts 113 to 120, is canceled. The requirements applicable to passenger vessels are transferred to a new Subchapter H. The requirements applicable to cargo and miscellaneous vessels are transferred to a new Subchapter I. The requirements regarding marine engineering are transferred to Subchapter F. The requirements regarding manning of vessels are transferred to a new Subchapter P.

Subchapter K—Seamen

The title for this subchapter is changed to "Marine Investigations and Suspension and Revocation Proceedings" since only Parts 136 and 137 are retained in this subchapter. The text of Part 131, regarding hours of labor on shipboard, Part 135, regarding language test for seamen, Part 140, regarding able seamen, and Part 141, regarding manning of inspected vessels, is revised and transferred to a new Subchapter P. The text of Part 133, regarding designation and approval of nautical school ships; rules for conduct of school ships, is revised, rearranged, renumbered and transferred to Parts 166 and 168 in Subchapter R. The text of Part 134, regarding United States Shipping Commissioners, is rearranged, renumbered and transferred to Part 16 in Subchapter B.

Subchapter L—Overtime Services

No change is made in this subchapter which contains only Part 143.

Subchapter M—Construction or Material Alteration of Passenger Vessels of the United States of 100 Gross Tons and Over Propelled by Machinery

This subchapter, consisting of Part 144, is canceled. The requirements are revised, rearranged and transferred to Parts 72, 73, and 74 in a new Subchapter H, regarding passenger vessels.

Subchapter N—Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels

No change is made in this subchapter, consisting of Parts 146 and 147. The changes considered at the public hearing held March 25, 1952, will be published in a separate document.

Subchapter O—Regulations Applicable to Certain Vessels During Emergency

No change is made in this subchapter, consisting of Part 154.

Subchapter P—General Provisions

This subchapter, consisting of Part 157, is canceled. The text of Part 157, regarding enforcement, is revised and transferred to Part 2 in Subchapter A.

Subchapter Q—Specifications

No change is made in the arrangement of the material in this subchapter, consisting of Parts 160 to 164. New subparts regarding marine engineering equipment are added to Part 162.

Subchapter R—Nautical Schools

This subchapter, consisting of Part 167, is editorially revised to agree with changes made in other parts in this chapter. No change was made in the arrangement of material. The text of §§ 133.0 to 133.4, regarding designation and approval of nautical school ships, is revised, rearranged, renumbered and transferred to this subchapter as a new Part 166. The text of §§ 133.5 to 133.18, regarding civilian nautical school ships, is rearranged, renumbered, and transferred to this subchapter as a new Part 168.

Since the Government of the United States of America, together with the Governments of the other countries which have become parties to the 1948 Convention for the Safety of Life at Sea, undertakes to give effect to the provisions of the Convention, it is hereby found necessary that the regulations in this document shall become effective on and after November 19, 1952.

By virtue of the authority vested in me as Commandant, United States Coast Guard, by Treasury Department Order No. 120, dated July 31, 1950 (15 F. R. 6521), to promulgate regulations in accordance with the statutes cited with the regulations below, the following amendments to the regulations are prescribed which shall become effective on and after November 19, 1952:

Subchapter A—Procedures Applicable to the Public

PART 2—VESSEL INSPECTIONS

Part 2 is amended to read as follows:

SUBPART 2.01—INSPECTING AND CERTIFICATING OF VESSELS

Sec.
2.01–1 Applications for inspections.
2.01–5 Certificates of inspection.
2.01–10 Inspection requirements.
2.01–15 Vessel repairs.
2.01–20 Revocation of certificates of inspection.
2.01–25 International Convention for the Safety of Life at Sea, 1948.
2.01–50 Special permits.
2.01–60 Overtime compensation.
2.01–70 Appeals.

SUBPART 2.20—REPORTS AND FORMS

2.20–1 Forms.
2.20–40 Chief engineer's reports.
2.20–50 Repairs or alterations in lifesaving or fire prevention equipment.
2.20–60 Reports of casualties and accidents.

SUBPART 2.30—NUMBERING OF UNDOCUMENTED VESSELS

2.30–1 Numbering.
2.30–10 Application.
2.30–20 Certificate issued.

SUBPART 2.50—NAVIGATION AND VESSEL INSPECTION LAWS

Sec.
2.50–1 Waivers.
2.50–20 Reports and assessments of penalties for violation of laws or regulations.
2.50–25 Payment of penalty for violation of law or regulation.
2.50–30 Motorboat Act violations.

SUBPART 2.75—APPROVALS OF SAFETY EQUIPMENT, MATERIALS AND INSTALLATIONS, AND QUALIFICATIONS FOR CONSTRUCTION PERSONNEL

Sec.
2.75–1 Approvals.
2.75–10 Requirements and tests.
2.75–50 Withdrawals or terminations of approvals.
2.75–60 Certification of ship's stores and supplies.
2.75–70 Welders.

SUBPART 2.85—LOAD LINES

2.85–1 Assignment of load lines.

SUBPART 2.90—PLANS, DRAWINGS OR BLUEPRINTS

2.90–1 General requirements.

AUTHORITY: §§ 2.01–1 to 2.90–1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416.

SUBPART 2.01—INSPECTING AND CERTIFICATING OF VESSELS

§ 2.01–1 *Applications for inspections*—(a) *Application forms.* (1) Applications for the annual inspections of vessels required to be inspected by 46 U. S. C. 362, 363, 367, 391, 391a, 395, 404, 405, 1333, shall be made by the master, owner or agent on the following Coast Guard forms which are obtainable from the Officer in Charge, Marine Inspection, at any local Marine Inspection Office, U. S. Coast Guard:

833—Application for Inspection of Vessel.
986—Application for Inspection of Foreign Passenger Vessel.

(2) These applications require information on name and type of vessel, nature of employment and route in which to be operated, and place where and date when she may be inspected.

(b) *To whom submitted.* The completed forms shall be submitted to the Marine Inspection Office located in, or nearest, the port at which the inspection is to be made. The applicant will be advised in writing of the time when the inspection will be made.

(c) *New vessels.* Applications for inspection of new vessels shall be preceded by the submission of applicable drawings or prints in accordance with specific requirements in Subchapters D (Tank Vessels), E (Load Lines), F (Marine Engineering), H (Passenger Vessels), I (Cargo and Miscellaneous Vessels) and/or J (Electrical Engineering) of this chapter applicable to that particular type of vessel and/or type of service in which it is proposed to be operated.

§ 2.01–5 *Certificates of inspection*—(a) *Issuance of certificates.* Certificates issued upon completion of the inspection of a vessel and on condition that the vessel and her equipment are approved by the inspectors a certificate on one of the following Coast Guard forms will be issued by the Officer in Charge, Marine Inspection, as required by 46 U. S. C. 399:

(1) CG 841—Certificate of Inspection for Steam or Motor Vessels.

(2) CG 842—Certificate of Inspection for Tank Barges.

(3) CG 852—Certificate of Inspection for Sail Vessels and Barges Carrying Passengers for Hire.

(4) CG 854—Temporary Certificate of Inspection.

(5) CG 856—Certificate of Inspection for Seagoing Barges of 100 Gross Tons or Over.

(6) CG 987—Certificate of Inspection for Foreign Passenger Vessels.

(7) CG 989—Certificate of Examination of Foreign Passenger Vessel of Country Having Inspection Laws Approximating Those of the United States.

(8) A—Approval of Boilers and Machinery on Steam Propelled Motorboats.

(9) B—Inspection of Boilers on Steam Propelled Motorboats.

(b) *Description of certificate.* These certificates describe the vessel; the route over which she may travel; the minimum manning requirements; the safety equipment and appliances required to be carried on board; the total number of persons which may be carried; the condition of the vessel and her machinery; the names of the master and the owner. The duration of the certificates is for a period of 1 year after which they must be renewed by making application for inspection as provided for in § 2.01–1.

(c) *Amending certificates.* Where by reason of a change in the character of a vessel or in her route, equipment, etc., the vessel will not comply with the requirements of the certificate of inspection previously issued a certificate amending such certificate may be issued at the discretion of the Officer in Charge, Marine Inspection, to whom request is made, on Coast Guard Form 853, Certificate Amending Certificate of Inspection by Changing Character of Vessel, Route, Equipment, etc.

(d) *Compliance with new requirements.* Where it is found that a vessel cannot comply with any of the new requirements in this chapter effective on or after November 19, 1952, because the equipment is not available, or the installation cannot be made without undue delay to the vessel, or for similar reasons, the Commandant may permit a reasonable time to be granted to such vessel to comply with the requirements. Where such permission is given, it shall be noted on the certificate of inspection together with the time limit granted.

§ 2.01–10 *Inspection requirements.* (a) If during the inspection of a vessel made at the request of the master, owner, or agent, the vessel or her equipment is found not to conform to the requirements of law or regulations in this chapter, the requirements which must be met will be listed on Form CG 835, Notice of Merchant Marine Inspection Requirements, and given to the master of the vessel.

(b) The Coast Guard on its own initiative may examine or inspect or reinspect at anytime any vessel subject to Title 52 of the Revised Statutes (R. S. 4399–4500; 46 U. S. C. 170, 214–240, 361–498), and acts amendatory thereof or supplemental thereto. If during such examination, inspection, or reinspection, any failure to comply with any applicable requirement of law and/or applicable regulations in this chapter, or any defects or imperfections become apparent tending to render the navigation of the vessel unsafe, or that repairs have become necessary, the Coast Guard will so notify the master and state what is required.

§ 2.01–15 *Vessel repairs.* (a) The procedures to be followed in notifying the Coast Guard about vessel repairs varies according to the type of vessel and service in which engaged. The requirements by type of vessels are set forth in Subchapters D (Tank Vessels), E (Load Lines), H (Passenger Vessels), and I (Cargo and Miscellaneous Vessels) of this chapter. The additional requirements for repairs of certain equipment and installations are in Subchapters F (Marine Engineering) and J (Electrical Engineering) of this chapter.

(b) If repairs to a vessel are necessary, such vessel may be permitted to proceed to another port for repairs, if in the opinion of the inspector it can be done with safety. The permit is granted by the Officer in Charge, Marine Inspection, upon request in writing by the master or owner of the vessel and is issued on Coast Guard Form 948, Permit To Proceed to Another Port for Repairs. No repairs or alterations affecting safety of a vessel or her machinery shall be made unless applicable requirements in Subchapters D (Tank Vessels), E (Load Lines), F (Marine Engineering), H (Passenger Vessels), I (Cargo and Miscellaneous Vessels) and/or J (Electrical Engineering) of this chapter are met.

§ 2.01–20 *Revocation of certificates of inspection.* Under authority of 46 U. S. C. 435 the certificates of inspection referred to in § 2.01–5 may be revoked if the vessel is found at reinspections not to comply with the terms of the vessel's certificate of inspection.

§ 2.01–25 *International Convention for the Safety of Life at Sea, 1948.*—(a) *Certificates required.* (1) The International Convention for the Safety of Life at Sea, 1948, requires one or more of the following certificates to be carried on certain vessels engaged in international voyages:

(i) Safety certificate for passenger vessels.

(ii) Safety equipment certificate for cargo ships (including tank ships).

(iii) Safety radiotelephony certificate.

(iv) Safety radiotelegraphy certificate.

(v) Exemption certificate.

(2) The United States Coast Guard will issue the certificates listed in paragraph (a) of this section.

(b) *Applications.* (1) The application for the inspection of a passenger vessel is made on the appropriate form listed in § 2.01–1, or by letter, to the Officer in Charge, Marine Inspection, in or nearest the port at which the inspection is to be made and shall be signed by the master or agent of the vessel. Further details are set forth in Subchapter H (Passenger Vessels) of this chapter.

(2) The application for the inspection of a cargo vessel including a tank vessel is made on the appropriate form listed in § 2.01–1, or by letter to the Officer in Charge, Marine Inspection, in or nearest the port at which the inspection is to be made and shall be signed by the master or agent of the vessel. Further details are set forth in Subchapters D (Tank Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter.

(3) The application for the inspection of a vessel other than passenger vessel concerning the issuance of a safety radiotelephony certificate or safety radiotelegraphy certificate is made by letter to the local office of the Federal Communications Commission, which agency is responsible for the inspection. The local inspector of the agency reports the results of the inspection to the Officer in Charge, Marine Inspection, who issues the certificate.

(c) *Certificates issued.* If a vessel meets the applicable requirements of the convention, it shall be issued one or more of the certificates listed in paragraph (a) of this section. These certificates describe the vessel or state the vessel is in compliance with the requirements of the convention.

(d) *Letter in lieu of a required certificate.* Where completion of the certification of any vessel cannot be effected prior to the sailing of the vessel on a foreign voyage, a letter in lieu of a certificate is issued by the Officer in Charge, Marine Inspection, on Coast Guard Form 969, explaining the failure of the ship to have on board the certificate required.

(e) *Exempted vessel.* A vessel may be exempted by the Commandant, U. S. Coast Guard, from complying with certain requirements of the convention upon request made in writing to him. In such case the exemptions are stated in the exemption certificate, which is issued by the Commandant through the appropriate Officer in Charge, Marine Inspection.

(f) *Foreign flag vessels.* At the request of the government of a country in which is registered a vessel engaged in international voyages, such a vessel may be issued the applicable certificate or certificates listed in paragraph (a) of this section by the Coast Guard. The certificate will be issued only after inspection has been made of the vessel and the vessel is found to comply with the requirements of the convention.

§ 2.01–50 *Special permits.*—(a) *Passengers or persons in addition to crew.* Special permits may be issued to certain vessels subject to inspection to carry persons in addition to those allowed by the certificates of inspection. Under authority of 46 U. S. C. 453 a passenger vessel may be permitted to engage in excursions and carry additional numbers of passengers. Application for the permit is made by the master, owner, or agent of the vessel to the Officer in Charge, Marine Inspection, on Coast Guard Form 950, Application for Excursion Permit. If, after inspection, permission is granted, it is given on Coast Guard Form 949, Permission to Carry Excursion Party. The permit describes the vessel, the route over which and the period during which the excursions may be made, and the safety equipment required for the additional persons indicated.

(b) *Persons other than crew on towing, oyster, or fishing steamers.* Steam towing, oyster dredging, and fishing vessels may be permitted to carry persons in addition to their crews under authority of 46 U. S. C. 458 by the District Commander. Application for such a permit is made by the master or agent of the

vessel to the Coast Guard District Commander on Form CG 955, Application for Towing, Oyster and Fishing Steamers to Carry Persons Other Than the Crew, which form is obtainable from the Coast Guard District Commander. If the application is approved the permit is issued by the Coast Guard District Commander on Form CG 957, Permit to Towing, Oyster and Fishing Steamers to Carry Persons Other Than the Crew. The master, owner, or agent of any of the above vessels carrying persons in addition to the crew is required to report to the District Commander that he has on board the vessel life preservers in addition to those required for the crew to accommodate the additional persons carried. This report is made on Form CG 956, Affidavit of Master or Owner of Towing, Oyster or Fishing Steamer That Life Preservers Are on Board, which may be obtained from any Coast Guard District Commander. The permit describes the vessel, the number of persons which may be carried in addition to her crew, and the number of life preservers provided.

§ 2.01–60 *Overtime compensation*—(a) *General.* Extra compensation for overtime services performed by inspectors of vessels and their assistants, shipping commissioners and their deputies and assistants who may be required to remain on duty between the hours of 5:00 p. m. and 8:00 a. m. or on Sundays or holidays to perform services in connection with the inspection of vessels or their equipment, supplying or signing on or discharging crews of vessels is authorized by 46 U. S. C. 382b and regulations in Part 143 of this chapter, together with the method of computing such extra compensation.

(b) *Application and certification of time.* Application for the performance of such overtime services and certification of services performed is made by the master, owner, or agent of a vessel to the Officer in Charge, Marine Inspection, on Form CG 830, Application for and Certificate of Overtime Service.

(c) *Collection.* The bill for the collection of the overtime compensation is submitted by the Officer in Charge, Marine Inspection, to the master, owner, or agent on whose vessel overtime services are performed on Form CG 832, Bill for Collection Overtime Services. Payment is made to the Collector of Customs of the port designated.

§ 2.01–70 *Appeals*—(a) *General.* Any person aggrieved by any decision or action of the Officer in Charge, Marine Inspection, may appeal therefrom to the Coast Guard District Commander of the district in which the action or decision was made. A further appeal may be made to the Commandant, U. S. Coast Guard, from the decision of the District Commander.

(b) *Time limits.* (1) Appeals from decisions of the inspectors or the Officer in Charge, Marine Inspection, to the Coast Guard District Commander, shall be made in writing within 30 days after the decisions or actions appealed from shall have been rendered or taken. Such appeals shall set forth the requirements appealed from and the reasons why the decision or action should be set aside or revised.

(2) Appeals from the decisions of the Coast Guard District Commander to the Commandant shall be made in writing within 30 days after the decisions appealed from shall have been rendered.

(c) *Decision on appeals.* Pending the determination of the appeal, the decision of the Officer in Charge, Marine Inspection, shall remain in effect. The decision of the Commandant is final.

SUBPART 2.20—REPORTS AND FORMS

§ 2.20–1 *Forms.* (a) Statutes and regulations require that certain forms be posted on vessels referred to in the statutes and regulations. The titles of the forms indicate the contents of the forms. They may be obtained from any Marine Inspection Office. The Coast Guard Forms and the statutes or regulations which require that they be posted are listed in this section.

(b) *CG 803.* Pilot Rules for Certain Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico, required by 33 U. S. C. 157, and 33 CFR 80.13 (b).

(c) *CG 804a.* Rules for Lights for Certain Classes of Vessels Navigating the Harbors, Rivers, and Other Inland Waters except the Great Lakes and their Connecting Tributary Waters as far East as Montreal and the Red River of the North and Rivers Emptying into the Gulf of Mexico, required by 33 U. S. C. 157.

(d) *CG 805.* Pilot Rules for Western Rivers, required by 46 U. S. C. 381, and 33 CFR 95.23.

(e) *CG 807.* Pilot Rules for the Great Lakes and their Connecting and Tributary Waters. 33 U. S. C. 243, 33 CFR 90.15 (b).

(f) *CG 811.* Instructions for the use of the Gun and Rocket Apparatus for Saving Life from Shipwreck as Practiced by the United States Coast Guard, required by §§ 35.10–10, 78.53, or 97.43 of this chapter.

(g) *CG 802.* Persons Allowed in Pilothouse and on Navigation Bridge, required by §§ 78.10, and 97.10 of this chapter.

(h) *CG 809A.* Station Bills, Drills and Reports of Masters, required by § 78.17–50 (f) of this chapter.

(i) *CG 809B.* Station Bills, Drills and Reports of Masters, required by §§ 35.10–1, or 97.15–35 (d) of this chapter.

(j) *CG 810.* Duties of Mates of Inland Steamers Carrying Passengers, required by § 157.35–5 of this chapter.

§ 2.20–40 *Chief engineer's reports.* (a) Repairs to boilers and pressure vessels. The chief engineer is required to report any repairs to boilers or unfired pressure vessels in accordance with §§ 33.25–5, 78.33–1, and 97.30–1 of this chapter.

(b) The chief engineer of any vessel is required to report any accident to a boiler, unfired pressure vessel, or machinery tending to render the further use of the item unsafe until repairs are made by §§ 35.25–5, 78.33–5, and 97.30–5 of this chapter.

(c) The chief engineer shall report the installation of new fusible plugs to the Officer in Charge, Marine Inspection, on Form CG–945 in accordance with § 61.45–20 of this chapter.

§ 2.20–50 *Repairs or alterations in lifesaving or fire prevention equipment.* No repairs or alterations shall be made to any lifesaving or fire detecting or fire extinguishing equipment except in an emergency without advance notice to the Officer in Charge, Marine Inspection. See §§ 33.01–20, 34.01–5, 78.33–10, and 97.30–10 of this chapter.

§ 2.20–60 *Reports of casualties and accidents*—(a) *General.* Reports of casualties or accidents occurring on or to vessels is required by 33 U. S. C. 361 or 46 U. S. C. 239 and the regulations supplementary thereto in §§ 35.50, 78.07, 97.07, and 136.05 of this chapter. A written notice is required from the master, owner, or agent of a vessel of the United States to the Officer in Charge, Marine Inspection, at or nearest the port where the casualty or accident occurred as soon as possible after the casualty or accident. A report is required whenever any vessel is involved in a casualty or accident involving loss of life, material loss of property, serious injury to any person, damage affecting the seaworthiness or efficiency of a vessel, stranding or grounding, or an aid to navigation under the jurisdiction of the Coast Guard.

(b) *Accidents.* The officer in charge of a vessel reports accidents on Form CG–924E, Report of Personal Accident Not Involving Death, whenever an accident occurs to passengers, members of the crew, and other persons who may be injured on board a vessel and incapacitated for a period in excess of 72 hours. This Form CG–924E if filed promptly will be accepted as the written notice required by the other regulations in this chapter.

(c) *Casualties.* The officer in charge of a vessel reports on Form CG–2692, Report of Marine Casualty (or Accident), when accidents or casualties involve death, damage affecting seaworthiness of a vessel, stranding or grounding, or material property damage in excess of $1,500. This Form CG–2692 will be accepted as the written notice required if submitted promptly.

(d) *Information required.* The written notice, as well as the reports, require a description of the vessel or vessels involved, names of owner and master, location, nature and probable cause of casualty or accident, the nature and extent of injury to persons, and the damage to property. The Forms CG–924E and CG–2692 may be obtained from any local marine inspection office.

(e) *Casualty involving aids to navigation.* The officer in charge of a vessel which collides with a lightship, buoy, or other aid to navigation under the jurisdiction of the Coast Guard, or is connected with any such collision is required to report the casualty or accident to the nearest Officer in Charge, Marine Inspection. See §§ 35.15–1, 78.07–20, 97.07–20, and 136.05–20 of this chapter.

CROSS REFERENCE: For investigations or hearings on marine casualties see Parts 4, 136, and 137 of this chapter.

SUBPART 2.30—NUMBERING OF UNDOCUMENTED VESSELS

§ 2.30–1 *Numbering.* The owner(s) of every undocumented vessel described in 46 U. S. C. 288 must obtain a certificate of award of number which number must be painted or attached to each bow of the vessel. The procedures to be followed in applying for such certificate; on transfer, loss, or destruction of the vessel; and on change of residence of owner from one Coast Guard or customs district to another are set forth in Part 172 of this chapter.

§ 2.30–10 *Application.* Application for a certificate for a vessel not previously numbered is made on Form CG 1512, Application for Number for Undocumented Motor Vessel, by the owner to the District Commander of the district in which the vessel is owned or to the Officer in Charge, Marine Inspection. The form is obtained at the office of the Coast Guard District Commander or Officer in Charge, Marine Inspection. The application lists the name and address of owner and description of the vessel and the engine and must be submitted together with evidence of ownership of the vessel. The purchaser(s) of a vessel already numbered shall execute the application on the back of Form CG 1513, Certificate of Award of Number to an Undocumented Vessel.

§ 2.30–20 *Certificate issued.* Upon complying with the necessary requirements as to prima facie evidence of ownership, Form CG 1513, Certificate of Award of Number to an Undocumented Vessel, is issued by the Coast Guard District Commander or Officer in Charge, Marine Inspection.

SUBPART 2.50—NAVIGATION AND VESSEL INSPECTION LAWS

§ 2.50–1 *Waivers*—(a) *Authority for and limitations on issuance.* Compliance with certain of the navigation and vessel inspection laws may be waived by the Commandant under authority of the act of December 27, 1950 (Public Law 891), and the delegation of waiver authority contained in Department of the Treasury Order CGFR 51–1, dated January 23, 1951 (16 F. R. 731), in any case where such waiver is deemed necessary in the interest of national defense.

(b) *Policy.* It is the policy of the Coast Guard, in the current administration of the laws and regulations relating to navigation and vessel inspection, to further the interests of national defense by simplifying the procedure involved therein, eliminating all causes of delay in the sailing of vessels, and by bringing about a proper balance between the factors of safety at sea and the national defense. While it is not the policy of the Coast Guard to countenance willful violations of the laws and regulations or negligence in meeting the requirements thereof, neither is it contemplated that masters who exercise all reasonable efforts to comply with the requirements in effect be cited for violations on technical grounds.

(c) *Waivers issued.* The waivers having general applicability are published in Part 154 of this chapter, as well as in 33 CFR Part 19.

(d) *Specific individual waivers.* (1) Applications for waivers affecting only one vessel in any one order under the provisions of § 154.01 of this chapter are made on Form CG–2633, Application for Waiver Order. The application shall state the name of the vessel, her employment, the requirements of law or regulations, waiver of which is requested, the reasons why waiver is necessary, and shall be signed by the master, owner, or agent of the vessel, or by the representative of any interested Government agency. The application shall be made to the Coast Guard District Commander or to his designated representative at the port or place where the vessel is located. In any port or place of the Canal Zone or in any foreign port or place the application shall be made to the designated representative of the Commandant at such port or place or if the Coast Guard has not established facilities in such port or place to the nearest designated representative of the Commandant at a port or place where such facilities have been established.

(2) If the request is granted the waiver order will describe the vessel, the requirements of law or regulations waived, the conditions to which the waiver is subject, and the period of time for which the waiver is effective.

(e) *General waivers.* Applications for waivers having general applicability should be addressed to the Commandant (M), U. S. Coast Guard, Washington, D. C. Only the Commandant is authorized to issue general waivers which affect more than one vessel in one order.

§ 2.50–20 *Reports and assessments of penalties for violation of laws or regulations.* (a) Reports of violation of navigation and vessel inspection laws and regulations in this chapter as well as in 33 CFR Parts 80 to 100, inclusive, administered and enforced by the Coast Guard are reported by Coast Guard personnel detecting them to the Coast Guard District Commander of the district in which the violations occurred. The alleged offender will be informed of the nature of the violations. Form CG 2767, Notice of Report of Violation, normally will be used.

(b) If a violation of law or regulation involves a civil penalty, the alleged offender will be informed of his right to apply for relief from the imposition of penalties. He may, if he so desires, appear in person before the Coast Guard District Commander or his designated representative. The written application is made to the Coast Guard District Commander and may be made on Form CG 2767A, Application for Relief from Penalties for Violation of Navigation and Vessel Inspection Laws and Regulations. If the application for relief is granted, the case is closed; if denied, the full or mitigated penalty is assessed and notice given to the offender on Form CG 2767B, Assessment of Penalties for Violation of the Navigation and Vessel Insection Laws and Regulations, and Conditional Mitigation of Penalties. This notice may provide for a reduction in the penalty on condition that the lesser penalty be paid within 30 days of the date of the notice.

(c) The offender will be given instructions for making an appeal to the Commandant from the actions of the Coast Guard District Commander if the amount of such penalty assessed exceeds $50. The decision of the Coast Guard District Commander in a case where the penalty is $50 or less is final.

(d) If payment of the assessed penalty or mitigated penalty is not made within 30 days of the date of the notice, or if appeal is not made, action to collect the full penalty is taken. If no application for relief is submitted, assessment of penalty is made on Form CG 2767C, Assessment of Penalties for Violation of Navigation and Vessel Inspection Laws and Regulations, and the offender is advised that court action by the United States Attorney will be recommended if payment of the penalty or penalties is not made within 30 days.

§ 2.50–25 *Payment of penalty for violation of law or regulation.* (a) The payment of any penalty is acknowledged on Coast Guard Form CG 2767E, Disbursing Officers' Receipt (Navigation Fine).

(b) If the penalty paid is determined by the Commandant to have been illegally, improperly, or excessively imposed, and the money has already been covered into the United States Treasury, the application for a refund may be made on Form CG 1086, Claim for Navigation Fine Exacted in Excess or in Error, which should be mailed to the appropriate Coast Guard District Commander for transmission to the Commandant. Such application must be made by the payor within one year of the date of payment of the penalty. If the penalty paid is determined by the Commandant to have been illegally, improperly, or excessively imposed and the money has not been covered into the United States Treasury, the Coast Guard upon application will refund the penalty or that portion considered to be in excess of the proper amount.

§ 2.50–30 *Motorboat Act violations.* The procedures described in §§ 2.50–20 and 2.50–25 are followed in the assessment of penalties for violations of the Act of June 7, 1918, regarding numbering of undocumented vessels and the Motorboat Act of April 25, 1940 (46 U. S. C. 288, 526–526t), and the applicable regulations in Parts 24–26, 70–78, 90–97, and 172 of this chapter.

SUBPART 2.75—APPROVALS OF SAFETY EQUIPMENT, MATERIALS AND INSTALLATIONS, AND QUALIFICATIONS FOR CONSTRUCTION PERSONNEL

§ 2.75–1 *Approvals.* (a) The Commandant is required by law or regulations in this chapter to approve certain installations and items of safety equipment before they may be installed or used on merchant vessels subject to inspection or on certain other vessels and motorboats.

(b) The items required to be approved by the Commandant are published in the FEDERAL REGISTER and in a pamphlet CG 190, Equipment Lists for Merchant Vessels.

(c) The approval of equipment granted a manufacturer cannot be transferred to another person, company, or

corporation, without specific approval from the Commandant.

§ 2.75–10 *Requirements and tests.* (a) The requirements and tests which the items are required to meet are in Parts 160–164 of this chapter, or are contained in specifications, copies of which may be obtained from the Commandant. If the requirements are met a certificate of approval for a term of 5 years is issued on Coast Guard Form 10030, Certificate of Approval, or are approved by letter by the Commandant. Notice of such approval is published in the FEDERAL REGISTER.

(b) These items which do not meet the requirements are returned to the applicants who are informed in what respects they failed to meet the requirements.

(c) Applications for approval shall be made to the Commandant and there shall be submitted with the application the items for which approval is desired or the appropriate plans and specifications.

(d) After approval is granted, manufacturers of certain items are required to submit an affidavit that the manufactured item will comply with the applicable rules and specifications. The affidavit is made on one of the following appropriate Coast Guard forms:

(1) CG 935—Affidavit of Manufacturer of Marine Boilers. (Submitted to the Officer in Charge, Marine Inspection.)

(2) CG 935A—Affidavit of Manufacturer of Materials or Appliances on Vessels Subject to the Rules and Regulations of the U. S. Coast Guard (required only for manufacturers of engineering material or appliances). (Submitted to the Commandant.)

(3) CG Form (no number)—Affidavit of Manufacturer of Standard Type Life Saving Equipment (buoyant cushions and cork and balsa life preservers only). (Submitted to the Commandant.)

§ 2.75–50 *Withdrawals or terminations of approvals.* (a) Approvals may be withdrawn if items are found not to be in compliance with the conditions of approval or if necessary by reason of changes in regulations. Notice will be given to the manufacturer who is given an opportunity to present his case at a public hearing of the Merchant Marine Council. (See 33 CFR 1.05–1, 1.05–10).

(b) Approvals of equipment are terminated when the manufacturer is no longer in business, or when the item is no longer being manufactured, or when the approval expires.

§ 2.75–60 *Certification of ship's stores and supplies.* Ship's stores and supplies of a dangerous nature as defined in §§ 147.02–1 and 147.02–2 of this chapter shall not be used on board vessels, domestic or foreign, on the navigable waters of the United States, including its territories and possessions, unless they have been certified for such use by the Coast Guard. The procedure for obtaining certification and the stores of a dangerous nature which do not require such certification are contained in or referred to in §§ 147.03–1 to 147.03–11, inclusive, of this chapter.

§ 2.75–70 *Welders.* Welders are required to pass tests before being permitted to make welds subject to inspection by the Coast Guard. Description of the tests is contained in Part 56 of this chapter. Upon satisfactory performance of the tests, Form CG 965, Record Card Welder's Qualification Tests, is issued by the Officer in Charge, Marine Inspection to the applicant who shall carry such card while engaged in welding subject to inspection by the Coast Guard or by similar cards issued by the Department of the Navy or the American Bureau of Shipping.

SUBPART 2.85—LOAD LINES

§ 2.85–1 *Assignment of load lines.* Vessels listed in 46 U. S. C. 85 and 46 U. S. C. 88 are required by those acts to have load lines assigned. The procedures for the assignment of load lines, the issuance of Load Line Certificates, the annual inspections required, the causes for cancellation of certificates, and the forms of those certificates are contained in the regulations appearing in Parts 43–45 of this chapter.

SUBPART 2.90—PLANS, DRAWINGS OR BLUEPRINTS

§ 2.90–1 *General requirements.* (a) Drawings, blueprints or plans showing the details of construction of vessels subject to inspection or installations thereon are required to be submitted for approval in accordance with applicable regulations in this chapter, information as to which may be obtained at any local Marine Inspection Office.

(b) The requirements for passenger vessel construction are in Parts 43–46, 70–78, of this chapter.

(c) The requirements for tank vessel construction are in Parts 30–39, 43–45, of this chapter.

(d) The requirements for cargo and miscellaneous vessel construction are in Parts 43–45, 90–97, of this chapter.

(e) The requirements for marine engineering installations or equipment are in Parts 50–69 of this chapter.

(f) The requirements for electrical engineering installations or equipment are in Parts 110–113 of this chapter.

(g) The requirements for items to be manufactured under specific approval by the Commandant are in Parts 160–164 of this chapter.

PART 3—MERCHANT MARINE PERSONNEL

Part 3 is amended to read as follows:

SUBPART 3.01—LICENSES AND DOCUMENTS

Sec.
3.01–1 Applications for licenses or documents.
3.01–75 Appeals.

SUBPART 3.13—SHIPMENT AND DISCHARGE OF SEAMEN

3.13–1 Signing-on and discharging seamen.
3.13–10 Shipping articles.
3.13–15 Forecastle card.
3.13–20 Crew list.
3.13–30 Allotments.
3.13–35 Log books.
3.13–40 Discharges.
3.13–45 Seamen not shipped or discharged before shipping commissioners.
3.13–50 Service record.

SUBPART 3.15—ARBITRATION BY SHIPPING COMMISSIONERS

Sec.
3.15–1 Arbitration.
3.15–5 Mutual releases.

SUBPART 3.19—EFFECTS OF DECEASED OR DESERTING SEAMEN

3.19–1 Accounts of wages and effects.
3.19–5 Kinsman's petition.

CROSS REFERENCE: For Coast Guard jurisdiction, see 33 CFR Part 1.

AUTHORITY: §§ 3.01–1 to 3.19–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 689.

SUBPART 3.01—LICENSES AND DOCUMENTS

§ 3.01–1 *Applications for licenses or documents.* Applications for licenses, extension of routes, or documents required for officers or seamen by 46 U. S. C. 214, 224, 226, 228, 229, 229b, 230, 237, 243, 367, 391a, 404, 405, 526f, 1333, 672, 643, 481, or 50 U. S. C., App., 1275 and Public Law 525, 80th Congress, 2d Session and the regulations in Parts 10 and 12 of this chapter as a prerequisite for employment shall be made on one of the following Coast Guard forms which are obtainable from the Officer in Charge, Marine Inspection, at any local marine inspection office: CG 866, License application; CG 719, Seaman's certificate application. The procedures for obtaining the licenses or documents, renewals, if necessary, or duplicates, if lost; the qualifications; and examinations necessary, are all set forth in Parts 10 and 12 of this chapter, together with Coast Guard numbers and titles of forms used, obtainable from any marine inspection office.

§ 3.01–75 *Appeals*—(a) *General.* Any person aggrieved by any decision or action of the Officer in Charge, Marine Inspection, may appeal therefrom to the Coast Guard District Commander of the district in which the action or decision was made. A further appeal may be made to the Commandant, U. S. Coast Guard, from the decision of the District Commander.

(b) *Time limits.* (1) Appeals from decisions of the inspectors or the Officer in Charge, Marine Inspection, to the Coast Guard District Commander, shall be made in writing within 30 days after the decisions or actions appealed from shall have been rendered or taken. Such appeals shall set forth the requirements appealed from and the reasons why the decision or action should be set aside or revised.

(2) Appeals from the decisions of the Coast Guard District Commander to the Commandant shall be made in writing within 30 days after the decisions appealed from shall have been rendered.

(c) *Decision on appeals.* Pending the determination of the appeal, the decision of the Officer in Charge, Marine Inspection, shall remain in effect. The decision of the Commandant is final.

SUBPART 3.13—SHIPMENT AND DISCHARGE OF SEAMEN

§ 3.13–1 *Signing-on and discharging seamen.* The master of any merchant vessel of 75 tons or upward, engaged in the intercoastal trade or of any vessel

bound from a port in the United States to any foreign port, other than vessels engaged in trade between the United States and the British North American possessions or the West Indies, or the Republic of Mexico, is required to enter into an agreement with each member of the crew who shall be discharged under the agreement and receive wages in the presence of a shipping commissioner in accordance with 46 U. S. C. 564. Where the complete crew has been signed on in the presence of a shipping commissioner and the later shipment of other seamen becomes necessary because of desertion or casualty, the master may sign on such replacements without the presence of a shipping commissioner but he is required to report the transaction immediately upon arrival at first port of call to the United States consul at or nearest such port, or in the Panama Canal Zone to the shipping commissioners or deputy shipping commissioners there. Shipping commissioners may, at the request of the master or owner of a vessel, ship and discharge all or part of the crew of a vessel engaged in the coastwise trade, or trade between the United States and the Dominion of Canada, or Newfoundland, or the West Indies, or Mexico, in accordance with 46 U. S. C. 646.

§ 3.13–10 *Shipping articles.* For the signing-on and discharging of seamen in accordance with 46 U. S. C. 564, 565, 566, and 713, and the regulations in Part 14 of this chapter, the shipping commissioners furnish Forms CG 705, 705A, and 705B, Shipping articles, same except for size, to record the agreement entered into between the master and crew of a vessel. Copies of these forms are obtainable upon request from shipping commissioners or Officers in Charge, Marine Inspection, at marine inspection offices, U. S. Coast Guard. It is the duty of shipping commissioners to see that each officer signing on is in possession of a continuous discharge book, certificate of identification, or United States merchant mariner's document, and a license; and that each signing on in an unlicensed capacity is in possession of a continuous discharge book or a certificate of identification and a certificate of service or certificate of efficiency or a United States merchant mariner's document representing such certificates. The shipping articles are prepared in quadruplicate, original and duplicate retained by the master pending completion of voyage, the triplicate retained by shipping commissioner, and quadruplicate forwarded to Commandant, U. S. Coast Guard. After the members of the crew are signed on the shipping commissioner prepares Form CG 708, Shipping of Seamen, certifying that the crew members knew and willingly signed the shipping articles, which is attached to the shipping articles. When the voyage or period of time covered by the shipping articles is completed, the members of the crew are discharged and the wages paid in the presence of the shipping commissioner, if required by law, and proper entries made in the shipping articles.

§ 3.13–15 *Forecastle card.* At the commencement of every voyage or engagement the master is required to post certain excerpts from the shipping articles in such part of the vessel as to be accessible to the crew in accordance with 46 U. S. C. 577. The Forecastle Card, Form CG 704, is obtainable from shipping commissioners or Officer in Charge, Marine Inspection, U. S. Coast Guard.

§ 3.13–20 *Crew list.* The master of a merchant vessel in certain cases is required to file with the collectors of customs a list of crew members. Form CG 710A is furnished for this purpose and may be obtained from shipping commissioners or Officer in Charge, Marine Inspection.

§ 3.13–30 *Allotments.* A merchant mariner desiring to make an allotment of his wages, in accordance with the regulations in Part 15 of this chapter, fills out Form CG 722, Seaman's Allotment Note, furnished by the shipping commissioner at the time he signs the shipping articles, or copies may be obtained upon request from shipping commissioners in the United States ports, or from United States consular officers in foreign ports. If the allotment complies with the law, it is approved. No appeals are permitted.

§ 3.13–35 *Log books.* Every vessel of 75 tons or upward, engaged in the intercoastal trade, or any vessel bound from a port in the United States to any foreign port, other than in the British North American possessions, shall have an official log book and every master of such vessel shall make or have entries made therein regarding matters required by 46 U. S. C. 201, 202, 203, 701, 702, and 85. One or more copies of the official log book, Coast Guard Form 706–B or 706–C, depending upon the number of persons employed as crew, is furnished the master of a vessel at the time the crew is signed on before a shipping commissioner; or copies of the official log book are obtainable upon request from the Officer in Charge, Marine Inspection. After the official log books have served their purpose they are filed with the shipping commissioner or Officer in Charge, Marine Inspection.

§ 3.13–40 *Discharges.* When a master of a vessel in accordance with Part 14 of this chapter discharges a merchant seaman and makes entries in the seaman's continuous discharge book, he will fill out Form CG 718E, Record of Entry in Continuous Discharge Book, which is forwarded to the Commandant, United States Coast Guard. The Form CG 718E is obtainable from shipping commissioners, collectors of customs and deputy collectors of customs acting as shipping commissioners or Officers in Charge, Marine Inspection. When a seaman holds a certificate of identification, a certificate of discharge, Form CG 718A, is issued and approved by a shipping commissioner or master as evidence of service performed. This form may be obtained upon request from shipping commissioners, collectors of customs or deputy collectors of customs acting as shipping commissioners or Officers in Charge, Marine Inspection.

§ 3.13–45 *Seamen not shipped or discharged before shipping commissioners.* Masters of certain vessels are required to report on ship personnel not shipped or discharged before a shipping commissioner. The Form CG 735 (T) has been prepared and must be used by the masters in accordance with Part 14 of this chapter. The form may be obtained upon request from shipping commissioners, collectors or deputy collectors of customs acting as shipping commissioners, or Officers in Charge, Marine Inspection. When voyage is completed, it must be delivered to nearest marine inspection office for transmission to Headquarters.

§ 3.13–50 *Service record.* A merchant mariner upon discharge in accordance with the requirements of Part 14 of this chapter has recorded in his continuous discharge book entries regarding his service. When the merchant mariner requests in person or writing for a record of sea service shown in a surrendered continuous discharge book, the Officer in Charge, Marine Inspection, or other issuing officer will prepare in duplicate Form CG 723, Certificate of Seamen's Service, and will deliver the original to the seaman and send the duplicate to Commandant, U. S. Coast Guard.

SUBPART 3.15—ARBITRATION BY SHIPPING COMMISSIONERS

§ 3.15–1 *Arbitration.* The Form CG 717, Agreement as to Arbitration, is used by seamen, master, consignees, agents or owners of vessels in submitting matters to shipping commissioners. This form is obtainable from shipping commissioners or collectors of customs or deputy collectors of customs acting as shipping commissioners. One copy of the form is made and this copy is retained by the shipping commissioner who acts on the matters submitted and his decision is final. No appeals are allowed.

§ 3.15–5 *Mutual releases.* The Form CG 713A, Mutual Release, is used by masters and seamen to effect settlement of claims for wages in cases of seamen signed off prior to completion of a voyage. This form may be obtained from shipping commissioners or collectors of customs or deputy collectors of customs acting as shipping commissioners. One copy is prepared and retained by the shipping commissioner who acts on the matters involved and his decision is final. A certificate of mutual release, Form CG 739, is prepared by the shipping commissioner or person acting as shipping commissioner, signed by the seaman when given to him by the shipping commissioner, and is used by the seaman not present at sign-off of vessel's crew as evidence that he has signed a mutual release. This form is prepared in duplicate from information in shipping articles and official log book.

SUBPART 3.19—EFFECTS OF DECEASED OR DESERTING SEAMEN

§ 3.19–1 *Accounts of wages and effects.* The masters of certain United States vessels in the cases of deceased or deserting seamen have to prepare Form CG 1517, Account of Wages and Effects of Deceased or Deserting Seamen, for use in disposition of the wages and effects of such seamen. The forms may

be obtained upon request from shipping commissioners, collectors or deputy collectors of customs acting as shipping commissioners, or Officers in Charge, Marine Inspection. Four copies are prepared and submitted to the shipping commissioner for transmission to the District Court. The shipping commissioner upon examination of information on the form, may approve or disapprove the account after reviewing the vessel's official log book. No appeal is permitted. The seamen's next of kin is informed of the action taken.

§ 3.19–5 *Kinsman's petition.* The next of kin of a deceased seaman has to petition the District Court of the United States for the wages and effects of the deceased seaman on Form CG 726, Kinsman's petition for wages and effects of deceased seaman. This form may be obtained upon request from shipping commissioners, collectors or deputy collectors of customs acting as shipping commissioners, or Officers in Charge, Marine Inspection. One copy of the form is presented by the next of kin to the United States District Court who acts upon the petition and either approves or disapproves the petition.

Subchapter B—Merchant Marine Officers and Seamen

PART 16—UNITED STATES SHIPPING COMMISSIONERS

Chapter I is amended by adding a new Part 16 to Subchapter B reading as follows:

Sec.
16.01 Shipping commissioners designated as enforcement officers.
16.05 Acceptance of unclaimed wages.
16.10 Payment of deceased or deserting seamen's wages.

AUTHORITY: §§ 16.01 to 16.10 issued under sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 689.

§ 16.01 *Shipping commissioners designated as enforcement officers.* (a) Section 7 of the act of June 25, 1936 (49 Stat. 1936), makes it the duty of the Commandant, U. S. Coast Guard to enforce the provisions of the above act through collectors of customs and other Government officers acting under the direction of the Coast Guard, and to make such rules and regulations as he may deem necessary to carry out the provisions of the said act.

(b) In order to enforce more effectually compliance with the provisions of this act, persons or officials performing United States shipping commissioners duties are hereby designated as enforcement officers for carrying out the provisions of the act.

§ 16.05 *Acceptance of unclaimed wages.* (a) Shipping commissioners or employees shall not accept unclaimed wages of seamen except in the form of checks or duly recognized money orders. In cases where the advisability of accepting the personal check of a master is doubtful, a money order must be provided.

(b) Every effort should be made to discourage the leaving of unclaimed wages with shipping commissioners. The acceptance of these wages is outside of the duties of shipping commissioners and they are personally responsible therefor.

CROSS REFERENCE: For Department of State regulations relating to seamen's wages, see 22 CFR 110.5.

§ 16.10 *Payment of deceased or deserting seamen's wages.* In the case of deceased or deserting seamen's wages, such wages must be paid in the form of a check or duly recognized money order, unless such payment is made direct to the shipping commissioner. In cases where the advisability of accepting the personal check of a master is doubtful, the payment must be made by money order or direct to the shipping commissioner in cash.

CROSS REFERENCE: For Department of State regulations relating to seamen's wages, see 22 CFR 110.5.

Subchapter C—Uninspected Vessels

1. The Title for Subchapter C is changed from "Motorboats, and Certain Vessels Propelled by Machinery Other Than by Steam More Than 65 Feet in Length" to "Uninspected Vessels," and Part 24 is amended to read as follows:

PART 24—GENERAL PROVISIONS

SUBPART 24.01—AUTHORITY AND PURPOSE

Sec.
24.01–1 Purpose of regulations.
24.01–5 Assignment of functions.
24.01–10 Authority for regulations.

SUBPART 24.05—APPLICATION

24.05–1 Vessels subject to the requirements of this subchapter.
24.05–5 Specific application noted in text.

SUBPART 24.10—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

24.10–1 Approved.
24.10–3 Carrying passengers for hire.
24.10–5 Carrying freight for hire.
24.10–7 Commandant.
24.10–9 Coast Guard District Commander.
24.10–11 Headquarters.
24.10–13 International voyage.
24.10–15 Marine inspector or inspector.
24.10–17 Motorboat.
24.10–19 Motor vessel.
24.10–21 Officer in Charge, Marine Inspection.
24.10–23 Passenger.
24.10–25 Pilot rules.
24.10–27 Vessel.

SUBPART 24.15—EQUIVALENTS

24.15–1 Conditions under which equivalents may be used.

SUBPART 24.20—GENERAL MARINE ENGINEERING REQUIREMENTS

24.20–1 Marine engineering details.

AUTHORITY: §§ 24.01–1 to 24.20–1 issued under R. S. 4405, as amended, 4462, as amended, sec. 17, 54 Stat. 166, as amended; 46 U. S. C. 375, 416, 526p.

SUBPART 24.01—AUTHORITY AND PURPOSE

§ 24.01–1 *Purpose of regulations.* (a) The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for motorboats, certain motor vessels, and barges carrying passengers when towed by motorboats or motor vessels in accordance with the intent of the Motorboat Act of April 25, 1940, as amended (54 Stat. 163–167; 46 U. S. C. 526–526t). The regulations are necessary to carry out the provisions of the Motorboat Act of April 25, 1940, and such regulations have the force of law.

§ 24.01–5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950, effective July 31, 1950 (15 F. R. 4935, 5 U. S. C. Note under 241), the functions formerly vested in the Commandant, United States Coast Guard, were transferred to the Secretary of the Treasury with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 24.01–10 *Authority for regulations—*(a) *General.* (1) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended, and in section 17 of the Motorboat Act of April 25, 1940, as amended (46 U. S. C. 375, 416, 526p).

(b) *Lifesaving appliances.* (1) The regulations regarding lifesaving appliances interpret or apply section 6 of the Motorboat Act of April 25, 1940, as amended (46 U. S. C. 526e).

(c) *Fire protection equipment.* (1) The regulations regarding fire protection equipment interpret or apply section 8 of the Motorboat Act of April 25, 1940, as amended, and section 2 of the Act of October 9, 1940, as amended (46 U. S. C. 526g, 463a).

(d) *Flame arresters.* (1) The regulations regarding flame arresters interpret or apply section 10 of the Motorboat Act of April 25, 1940, as amended (46 U. S. C. 526i).

(e) *Ventilation of bilges.* (1) The regulations regarding ventilation of bilges interpret or apply section 11 of the Motorboat Act of April 25, 1940, as amended (46 U. S. C. 526j).

SUBPART 24.05—APPLICATION

§ 24.05–1 *Vessels subject to the requirements of this subchapter.* (a) This subchapter shall be applicable to all vessels indicated in Column 6 of Table 24.05–1 (a), and shall apply to all such United States flag vessels, and to all such foreign vessels, except as follows:

(1) Any vessel operating exclusively on inland waters which are not navigable waters of the United States.

(2) Any vessel while laid up and dismantled and out of commission.

(3) With the exception of vessels of the U. S. Maritime Administration, any vessel with title vested in the United States and which is used for public purposes.

TABLE 24.05-1 (a)

Method of propulsion	Size or other limitations	Classes of vessels (including motorboats) examined or inspected under various Coast Guard regulations			
		Vessels inspected and certificated under Subchapter D—Tank Vessels [1]	Vessels inspected and certificated under Subchapter H—Passenger Vessels [1 2]	Vessels inspected and certificated under Subchapter I—Cargo and Miscellaneous Vessels [1 2]	Vessels subject to provisions of Subchapter C—Uninspected Vessels [1 2 3]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Steam	Vessels 40 feet in length and under.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tug boats and tow boats.	All vessels except those covered by Subchapters D and I.
	Vessels over 40 but not over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tug boats and tow boats.	All vessels except those covered by Subchapters D and I.[5]
	Vessels over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew. 3. Towing and fishing vessels, in other than ocean and coastwise service, issued a permit to carry persons on the legitimate business of the vessel, in addition to the crew, but not to exceed one for each net ton of the vessel.	All vessels except those covered by Subchapters D and H.	None.
Motor	Vessels of not over 15 gross tons.	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	None	All vessels except those covered by Subchapter D.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.	All vessels carrying more than 12 passengers on an international voyage, except yachts, and all other vessels carrying passengers for hire except documented cargo vessels over 65 feet in length issued a permit to carry not more than 16 persons in addition to the crew.	All vessels carrying freight for hire except those covered by Subchapters D and H.	All vessels except those covered by Subchapters D, H, and I.
	Seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew.	All vessels except those covered by Subchapters D and H, and those engaged in the fishing, oystering, clamming, crabbing, or any other branch of the fishery, kelp, or sponge industry.	All vessels except those covered by Subchapters D, H, and I.
Sail		All vessels carrying combustible or inflammable liquid cargo in bulk.	All vessels over 700 gross tons carrying passengers for hire.	None	None.
	Seagoing barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges 100 gross tons and over carrying passengers.	All barges 100 gross tons and over except those covered by Subchapters D and H.	All barges carrying passengers except those covered by Subchapter H.
Non self-propelled.	Inland barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges over 100 gross tons carrying passengers for hire.	None	All barges carrying passengers except those covered by Subchapter H.

[1] Subchapters E (Load Lines), F (Marine Engineering), and J (Electrical Engineering) of this chapter are also applicable under certain conditions.

[2] Public nautical school ships, other than vessels of the Navy and Coast Guard, shall meet the requirements of part 167 of Subchapter R (Nautical Schools) of this chapter. Civilian nautical school ships, as defined by 46 U. S. C. 1331, shall meet the requirements of Subchapter H (Passenger Vessels) and part 168 of Subchapter R (Nautical Schools) of this chapter.

[3] Any vessel on an international voyage is subject to the applicable requirements of the International Convention for the Safety of Life at Sea, 1948.

[4] Length measured from end to end over deck, excluding sheer.

[5] Boilers and machinery are subject to examination.

[6] Vessels covered by Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter, where the principal purpose or use of the vessel is not for the carriage of liquid cargo, may be granted a permit to carry a limited amount of combustible liquid cargo in bulk. The portion of the vessel used for the carriage of the combustible liquid cargo shall meet the requirements of Subchapter D (Tank Vessels) in addition to the requirements of Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter.

§ 24.05-5 *Specific application noted in text.* (a) At the beginning of the various parts, subparts, and sections, a more specific application is generally given for the particular portion of the text involved. This application sets forth the types, sizes, or services or vessels to which the text pertains, and in many cases limits the application of the text to vessels contracted for before or after a specific date. As used in this subchapter, the term "vessels contracted for" includes not only the contracting for the construction of a vessel, but also the contracting for a material alteration to a vessel, the contracting for the conversion of a vessel to a passenger vessel, and the changing of service or route of a vessel if such change increases or modifies the general requirements for the vessel or increases the hazards to which it might be subjected.

SUBPART 24.10—DEFINITION OF TERMS USED IN THIS SUBCAPTER

§ 24.10-1 *Approved.* This term means approved by the Commandant unless otherwise stated.

§ 24.10-3 *Carrying passengers for hire.* The carriage of any person or persons by a vessel for a valuable consideration, whether directly or indirectly flowing to the owner, charterer, operator, agent or any other person interested in the vessel.

§ 24.10-5 *Carrying freight for hire.* The carriage of any goods, wares, or merchandise or any other freight for a valuable consideration, whether directly or indirectly flowing to the owner, charterer, operator, agent, or any other person interested in the vessel.

§ 24.10-7 *Commandant.* This term means the Commandant of the Coast Guard.

§ 24.10-9 *Coast Guard District Commander.* This term means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within his district, which include the inspection, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 24.10-11 *Headquarters.* This term means the Office of the Commandant, Washington, D. C.

§ 24.10-13 *International voyage.* An international voyage as applied to United States vessels includes voyages between United States ports and ports

outside the United States as well as between United States Continental ports and ports in the Territory of Alaska, Commonwealth of Puerto Rico, Territory of Hawaii, the Panama Canal Zone, or any other separate portion of the United States constituting a possession or held under a protectorate or mandate. However, vessels solely navigating the Great Lakes and their connecting and tributary waters as far east as the exit of the Lachine Canal at Montreal, in the province of Quebec, Canada, shall not be considered as on an international voyage for the purpose of the regulations contained in this subchapter.

§ 24.10–15 *Marine inspector or inspector.* These terms mean any person from civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspection, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 24.10–17 *Motorboat.* This term means any vessel indicated in Column 6 of Table 24.05–1 (a), 65 feet in length or less which is propelled by machinery (including steam). The length shall be measured from end to end over the deck excluding sheer. This term includes a boat temporarily or permanently equipped with a detachable motor and any such boat when so propelled is subject to the applicable provisions of the Motorboat Act of April 25, 1940, and the regulations promulgated thereunder. For the purpose of this subchapter, motorboats are included under the term "vessel" unless specifically noted otherwise. The various classes of motorboats are as follows:

Class A—Any motorboat less than 16 feet in length.

Class 1—Any motorboat 16 feet or over and less than 26 feet in length.

Class 2—Any motorboat 26 feet or over and less than 40 feet in length.

Class 3—Any motorboat 40 feet or over and not more than 65 feet in length.

§ 24.10–19 *Motor vessel.* This term means any vessel more than 65 feet in length, which is propelled by machinery other than steam.

§ 24.10–21 *Officer in Charge, Marine Inspection.* This term means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who, under the superintendence and direction of the Coast Guard District Commander, is in charge of an inspection zone for the performance of duties with respect to the inspections, enforcement, and administration of Title 52 Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 24.10–23 *Passenger.* A passenger is every person, other than the master and the members of the crew or other persons employed or engaged in any capacity on board a vessel in the business of that vessel. In the case of a vessel on an international voyage a child under one year of age is not counted as a passenger.

§ 24.10–25 *Pilot rules.* (a) The term "pilot rules" means the statutory rules of the road and the implementing regulations of the Commandant. The regulatory pilot rules are contained in 33 CFR Parts 80, 82, 84, 90, 92, 95, and 100.

(b) In accordance with law, the Coast Guard publishes the statutory rules of the road and regulatory pilot rules in pamphlet form as follows:

(1) Rules to Prevent Collisions of Vessels and Pilot Rules for Certain Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico. (CG 169)

(2) Pilot Rules for the Great Lakes and Their Connecting and Tributary Waters and the St. Marys River. (CG 172)

(3) Pilot Rules for the Western Rivers and the Red River of the North. (CG 184)

§ 24.10–27 *Vessel.* Where the word "vessel" is used in this subchapter, it shall be considered to include all vessels indicated in Column 6 of Table 24.05–1 (a), except as otherwise noted in this subpart.

SUBPART 24.15—EQUIVALENTS

§ 24.15–1 *Conditions under which equivalents may be used.* (a) Where in this subchapter it is provided that a particular fitting, appliance, apparatus, or equipment, or type thereof, shall be fitted or carried in a vessel, or that any particular arrangement shall be adopted, the Commandant may accept in substitution therefor any other fitting, apparatus, or equipment, or type thereof, or any other arrangement, provided that he shall have been satisfied by suitable trials that the fitting, appliance, apparatus, or equipment, or type thereof, or the arrangment is at least as effective as that specified in this subchapter.

(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment, apparatus, or arrangement not specifically required by law is unreasonable or impracticable, the Commandant may permit the use of alternate equipment, apparatus, or arrangement to such an extent and upon such conditions as will insure to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subchapter.

SUBPART 24.20—GENERAL MARINE ENGINEERING REQUIREMENTS

§ 24.20–1 *Marine engineering details.* (a) All marine engineering details relative to the design, construction, and testing of boilers and machinery on steam-propelled motorboats of over 40 feet in length will be found in Subchapter F (Marine Engineering) of this chapter.

PART 25—REQUIREMENTS

2. Part 25 is amended to read as follows:

SUBPART 25.01—APPLICATION

Sec.
25.01–1 Applicable to all vessels.

SUBPART 25.05—NAVIGATION LIGHTS AND SHAPES

Sec.
25.05–1 Vessels other than motorboats.
25.05–5 Motorboats operating on the high seas.
25.05–10 Motorboats operating on the navigable waters of the United States.

SUBPART 25.10—WHISTLES

25.10–1 Vessels other than sailing vessels, barges, and motorboats.
25.10–5 Motorboats operating on the high seas.
25.10–10 Motorboats operating on the navigable waters of the United States.

SUBPART 25.15—FOG HORNS

25.15–1 Vessels other than motorboats.
25.15–5 Motorboats.

SUBPART 25.20—FOG BELLS

25.20–1 Vessels other than motorboats.
25.20–5 Motorboats operating on the high seas.
25.20–10 Motorboats operating on the navigable waters of the United States.

SUBPART 25.25—LIFE PRESERVERS AND OTHER LIFESAVING EQUIPMENT

25.25–1 Application.
25.25–5 General provisions.
25.25–10 Life preservers and other lifesaving equipment required.
25.25–15 Storage.
25.25–90 Vessels contracted for prior to November 19, 1952.

SUBPART 25.30—FIRE EXTINGUISHING EQUIPMENT

25.30–1 Application.
25.30–5 General provisions.
25.30–10 Hand portable fire extinguishers and semiportable fire extinguishing systems.
25.30–15 Fixed fire extinguishing systems.
25.30–20 Fire extinguishing equipment required.
25.30–90 Vessels contracted for prior to November 19, 1952.

SUBPART 25.35—CARBURETOR BACKFIRE FLAME ARRESTERS

25.35–1 Must be approved.

SUBPART 25.40—VENTILATION

25.40–1 Tanks and engine spaces.

SUBPART 25.45—LIQUEFIED PETROLEUM GAS

25.45–1 Prohibited on vessels carrying passengers for hire.

AUTHORITY: §§ 25.01–1 to 25.45–1 issued under R. S. 4405, as amended, 4462, as amended, sec. 17, 54 Stat. 166; 46 U. S. C. 375, 416, 526p. Interpret or apply sec. 2, 54 Stat. 1028, as amended; 46 U. S. C. 463a.

SUBPART 25.01—APPLICATION

§ 25.01–1 *Applicable to all vessels.* (a) The provisions of this part shall apply to all vessels except as specifically noted.

SUBPART 25.05—NAVIGATION LIGHTS AND SHAPES

§ 25.05–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be equipped with navigation lights and shapes as prescribed by the Pilot Rules applicable to the waters on which the vessel is navigated.

§ 25.05–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for navi-

gation lights and shapes prescribed by § 25.05–1 for vessels other than motorboats.

§ 25.05–10 *Motorboats operating on the navigable waters of the United States.* (a) Every motorboat operating on the navigable waters of the United States shall, in all weathers from sunset to sunrise, carry and exhibit lights when under way as prescribed by this section, and during such time no other lights which may be mistaken for those prescribed shall be exhibited. No penalty is incurred by motorboats for a failure to carry lights between the hours of sunrise and sunset.

(b) Every motorboat of Classes A and 1 shall carry the following lights:

(1) A bright white light aft to show all around the horizon.

(2) A combined lantern in the fore part of the vessel and lower than the white light aft, showing green to starboard and red to port, so fixed as to throw the light from right ahead as to to 2 points abaft the beam on their respective sides.

(c) Every motorboat of Classes 2 and 3 shall carry the following lights:

(1) A bright white light in the fore part of the vessel as near the stem as practicable so constructed as to show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light 10 points on each side of the vessel; namely, from right ahead to 2 points abaft the beam on either side.

(2) A bright white light aft to show all around the horizon and higher than the white light forward.

(3) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side. The said lights shall be fitted with inboard screens of sufficient length and height or shall be mounted on cabin sides and so set as to prevent these lights from being seen across the bow.

(d) All motorboats propelled by sail and machinery or by sail alone shall carry and exhibit the following lights:

(1) Motorboats of Classes A and 1 when propelled by sail and machinery or by sail alone shall carry the white light prescribed by § 25.05–10 (b) (1), but not the lantern prescribed by § 25.05–10 (b) (2).

(2) Motorboats of Classes 2 and 3 when propelled by sail and machinery or by sail alone shall carry the colored lights prescribed by § 25.05–10 (c) (3), but not the white lights prescribed by § 25.05–10 (c) (1) and (2).

(3) In addition, motorboats of all classes when so propelled shall carry ready at hand a lantern or flashlight showing a white light which shall be exhibited in sufficient time to avert collision.

(e) Every white light prescribed by this section shall be of such character as to be visible at a distance of at least 2 miles. Every colored light prescribed by this section shall be of such character as to be visible at a distance of at least 1 mile. The word "visible" when applied to lights shall mean visible on a dark night with clear atmosphere.

(f) The lights described in paragraphs (a) through (d) of this section are required by the Motorboat Act, as amended, 46 U. S. C. 526b. Other navigation lights and shapes required by the Pilot Rules applicable to the waters on which the motorboat is operated, such as anchor lights, amber whistle light, etc., which are not in conflict with the lights required by the Motorboat Act, shall also be carried.[1]

SUBPART 25.10—WHISTLES

§ 25.10–1 *Vessels other than sailing vessels, barges, and motorboats.* (a) All vessels other than sailing vessels, barges, and motorboats shall be equipped with an efficient whistle or similar appliance to give the necessary whistle signals required by the Pilot Rules applicable to the waters on which the vessel is navigated.

§ 25.10–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for whistles or similar appliances prescribed by § 25.10–1 for vessels other than motorboats.

§ 25.10–10 *Motorboats operating on the navigable waters of the United States.* (a) Motorboats operating on the navigable waters of the United States shall be provided with an efficient whistle or other sound producing mechanical device as set forth in Table 25.10–10 (a), except:

(1) Commercial fishing motorboats may carry any device specified in Table 25.10–10 (a).

(2) Motorboats engaged in a race which has been previously arranged or announced, or while engaged in such navigation as is incidental to the tuning up of the motorboat and engines for the race, need not carry the devices required by Table 25.10–10 (a).

TABLE 25.10–10 (a)

Class of motorboat	Type of device
A	None.
1	Mouth, hand, or power operated, capable of producing a blast of 2 seconds or more duration, and audible for at least one-half mile.
2	Hand or power operated, capable of producing a blast of 2 seconds or more duration, and audible for a distance of at least 1 mile.
3	Power operated, capable of producing a blast of 2 seconds or more duration, and audible for a distance of at least 1 mile.

SUBPART 25.15—FOG HORNS

§ 25.15–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be equipped with an efficient fog horn as prescribed by the Pilot Rules applicable to the waters on which the vessel is navigated. On vessels in ocean or coastwise service, the fog horn shall be sounded by mechanical means.

§ 25.15–5 *Motorboats.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for fog horns prescribed by § 25.15–1 for vessels other than motorboats.

SUBPART 25.20—FOG BELLS

§ 25.20–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be provided with fog bells as prescribed by the Pilot Rules applicable to the waters on which the vessel is operated.

§ 25.20–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for fog bells prescribed by § 25.20–1 for vessels other than motorboats.

§ 25.20–10 *Motorboats operating on the navigable waters of the United States.* (a) When operating on the navigable waters of the United States, motorboats of Classes A and 1 are not required to carry fog bells. However, motorboats of Classes 2 and 3 operating on the navigable waters of the United States shall be provided with an efficient fog bell, except:

(1) Motorboats engaged in a race which has been previously arranged or announced, or while engaged in such navigation as is incidental to the tuning up of the motorboat and engines for the race, need not carry the fog bell required by this section.

SUBPART 25.25—LIFE PRESERVERS AND OTHER LIFESAVING EQUIPMENT

§ 25.25–1 *Application.* (a) The provisions of this subpart, with the exception of § 25.25–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to that date shall meet the requirements of § 25.25–90.

[1] Running lights. The lights provided for in section 3 of the Act of April 25, 1940 (54 Stat. 164, U. S. C. 526b), are running lights for motorboats subject to the provisions of that act in lieu of the lights prescribed respectively, by Article 2 of the Act approved June 7, 1897 (30 Stat. 96, 33 U. S. C. 172) covering certain harbors, rivers, and inland waters of the United States); Rule 3 of the act approved February 8, 1895, as amended (28 Stat. 645, as amended, 33 U. S. C. 252) (covering the Great Lakes and their connecting and tributary waters); and Rules 3, 5, 6, and 7 of R. S. 4233, as amended (28 Stat. 672, 33 U. S. C. 312, 314–316) (covering western rivers and the Red River of the North). These running lights are required to be carried on all motorboats when under way on navigable waters of the United States, in all weathers, from sunset to sunrise, but not on the high seas. Motorboats, when on the high seas, shall exhibit the lights prescribed by the International Rules of 1890, as amended (26 Stat. 312–325, as amended, 33 U. S. C. 71–82). The provisions of section 3 of the Act of April 25, 1940 (54 Stat. 164, 46 U. S. C. 526b), requiring running lights on motorboats are not in conflict with the provisions of the acts previously cited requiring anchor lights and other lights in addition to the running lights on pilot, towing, and fishing vessels. It will be observed that the penalties for violations of existing laws not in conflict with the act of April 25, 1940 (54 Stat. 163–167, 46 U. S. C. 526–526t), remain unchanged.

§ 25.25–5 *General provisions.* (a) Where equipment in this subpart is required to be of an approved type, such equipment requires the specific approval of the Commandant. Such approvals are published in the FEDERAL REGISTER, and in addition, are contained in Coast Guard publication CG–190, "Equipment Lists for Merchant Vessels."

(b) Specifications for items of equipment required in this subpart have been promulgated and are contained in Subchapter Q (Specifications) of this chapter. In general, such specifications are of interest only to the manufacturer of the specific item of equipment.

(c) All life preservers shall be of an approved type, constructed in accordance with the applicable provisions of Subparts 160.002, 160.003, 160.004, or 160.005 of Subchapter Q (Specifications) of this chapter.

(d) All wood floats shall be of a type constructed in accordance with Subpart 160.039 of Subchapter Q (Specifications) of this chapter.

(e) All buoyant cushions shall be of an approved type, constructed in accordance with the applicable provisions of Subpart 160.007 or 160.008 of Subchapter Q (Specifications) of this chapter.

(f) All ring life buoys shall be of an approved type, constructed in accordance with Subpart 160.009 of Subchapter Q (Specifications) of this chapter.

§ 25.25–10 *Life preservers and other lifesaving equipment required.* (a) All motor vessels shall carry an approved life preserver for each person on board. Motor vessels carrying passengers for hire shall also be provided with an additional number of approved life preservers suitable for children, equal to at least 10 percent of the total number of persons carried.

(b) All motorboats shall carry lifesaving equipment as follows:

(1) Motorboats which carry passengers for hire shall be provided with an approved life preserver for each person carried, and with an additional number of approved life preservers suitable for children, equal to at least 10 percent of the total number of persons carried.

(2) Motorboats of Class 3 not carrying passengers for hire shall carry an approved life preserver or ring life buoy for each person on board.

(3) Commercial fishing motorboats of Class 3 shall carry an approved life preserver, ring life buoy, or wood float for each person on board.

(4) Commercial fishing motorboats of Class A, 1, or 2 shall carry an approved life preserver, ring life buoy, buoyant apparatus, or wood float for each person on board.

(5) All motorboats not otherwise specifically provided for shall carry an approved life preserver, ring life buoy, or buoyant apparatus for each person on board.

(c) All barges carrying passengers for hire shall be provided with an approved life preserver for each person carried, and with an additional number of approved life preservers suitable for children equal to at least 10 percent of the total number of persons carried when such barges are regularly operated with motorboats or motor vessels or steam vessels.

§ 25.25–15 *Storage.* (a) The lifesaving equipment on all vessels shall be so placed as to be readily accessible.

§ 25.25–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the applicable provisions of §§ 25.25–5 through 25.25–15 insofar as the number of items of equipment and the method of stowage is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications may be continued in service so long as they are maintained in good condition. All new installations and replacements shall meet the applicable specifications.

SUBPART 25.30—FIRE EXTINGUISHING EQUIPMENT

§ 25.30–1 *Application.* (a) The provisions of this subpart, with the exception of § 25.30–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to that date shall meet the requirements of § 25.30–90.

§ 25.30–5 *General provisions.* (a) Where equipment in this subpart is required to be of an approved type, such equipment requires the specific approval of the Commandant. Such approvals are published in the Federal Register, and in addition, are contained in Coast Guard publication CG–190, "Equipment List for Merchant Vessels." (b) All hand portable fire extinguishers, semiportable fire extinguishing systems, and fixed fire extinguishing systems shall be of an approved type.

§ 25.30–10 *Hand portable fire extinguishers and semiportable fire extinguishing systems.* (a) Hand portable fire extinguishers and semiportable fire extinguishing systems are classified by a combination letter and number symbol. The letter indicating the type of fire which the unit could be expected to extinguish, and the number indicating the relative size of the unit.

(b) For the purpose of this subchapter, all required hand portable fire extinguishers and semiportable fire extinguishing systems are of the "B" type; i.e., suitable for extinguishing fires involving flammable liquids, greases, etc.

(c) The number designations for size will start with "I" for the smallest to "V" for the largest. For the purpose of this subchapter, only sizes I through III will be considered. Sizes I and II are considered hand portable fire extinguishers and sizes III, IV, and V are considered semiportable fire extinguishing systems which shall be fitted with suitable hose and nozzle or other practicable means so that all portions of the space concerned may be covered. Examples of size graduations for some of the typical hand portable and semiportable fire extinguishing systems are set forth in Table 25.30–10 (c).

TABLE 25.30–10 (c)

Classification type—size	Foam, gallons	Carbon dioxide, pounds	Carbon tetrachloride, quarts	Dry chemical, pounds
B–I	1¼	4	1	1
B–II	2½	15	--------	12
B–III	12	35	--------	(1)

[1] Minimum values not established at this time.

(d) All hand portable fire extinguishers and semiportable fire extinguishing systems shall have permanently attached thereto a metallic name plate giving the name of the item, the rated capacity in gallons, quarts, or pounds, the name and address of the person or firm for whom approved, and the identifying mark of the actual manufacturer.

§ 25.30–15 *Fixed fire extinguishing systems.* (a) When a fixed fire extinguishing system is installed, it shall be of an approved carbon dioxide type, designed and installed in agreement with the applicable provisions of Subpart 76.15 of Subchapter H (Passenger Vessels) of this chapter.

§ 25.30–20 *Fire extinguishing equipment required.* (a) *Motorboats.* (1) All motorboats shall carry at least the minimum number of hand portable fire extinguishers set forth in Table 25.30–20 (a) (1), except that motorboats propelled by outboard motors and not carrying passengers for hire need not carry such hand portable fire extinguishers.

TABLE 25.30–20 (a) (1)

Class of motorboat	Length, feet	Minimum number of B–I or B–II hand portable fire extinguishers required	
		No fixed fire extinguishing system in machinery space	Fixed fire extinguishing system in machinery space
A	Under 16	1	0
1	16 and over, but under 26	1	0
2	26 and over, but under 40	1	1
3	40 and over, but not over 65	1	1

(b) *Motor vessels.* (1) All motor vessels shall carry at least the minimum number of hand portable fire extinguishers set forth in Table 25.30–20 (b) (1).

TABLE 25.30–20 (b) (1)

Gross tonnage		Minimum number of B–II hand portable fire extinguishers
Over	Not over	
--------	50	1
50	100	2
100	500	3
500	1,000	6
1,000	--------	8

(2) In addition to the hand portable fire-extinguishers required by Subparagraph (1) of this paragraph, the following fire-extinguishing equipment shall be fitted in the machinery space:

(i) One Type B–II hand portable fire extinguisher shall be carried for each 1,000 B. H. P. of the main engines or fraction thereof. However, not more than 6 such extinguishers need be carried.

(ii) On motor vessels of over 300 gross tons, either one Type B–III semiportable fire-extinguishing system shall be fitted, or alternatively, a fixed fire-extinguishing system shall be fitted in the machinery space.

(c) *Barges carrying passengers.* (1) All barges of 65 feet in length or less carrying passengers, which are regularly operated with a motorboat or motor vessel, shall be fitted with hand portable fire extinguishers as required by Table 25.30–20 (a) (1), depending upon the length of the barge.

(2) All barges of over 65 feet in length carrying passengers, which are regularly operated with a motorboat or motor vessel, shall be fitted with hand portable fire extinguishers as required by Table 25.30–20 (b) (1), depending upon the gross tonnage of the barges.

§ 25.30–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the applicable provisions of §§ 25.30–5 through 25.30–20 insofar as the number and general type of equipment is concerned. Existing items of equipment and installations previously approved but not meeting the applicable requirements for type approval may be continued in service so long as they are in good condition. All new installations and replacements shall meet the requirements of §§ 25.30–5 through 25.30–20.

SUBPART 25.35—CARBURETOR BACKFIRE FLAME ARRESTERS

§ 25.35–1 *Must be approved.* (a) Carburetors on all engines on motorboats, other than outboard engines, and on all motor vessels, shall be fitted with an approved device for arresting backfire, constructed in accordance with Subpart 162.015 of Subchapter Q (Specifications) of this chapter. Installations made before November 19, 1952, need not meet the detailed requirements of the specification and may be continued in use so long as they are in good condition.

SUBPART 25.40—VENTILATION

§ 25.40–1 *Tanks and engine spaces.* (a) All motorboats or motor vessels using fuel having a flash point of 110 degrees F. or less shall have at least 2 ventilators fitted with cowls or their equivalent for the purpose of properly and efficiently ventilating the bilges of every engine and fuel tank compartment in order to remove any inflammable or explosive gases. Such motorboats or motor vessels so constructed as to have the greater portion of the bilges under the engines and fuel tanks open and exposed to the natural atmosphere at all times need not be required to be fitted with such ventilators.

SUBPART 25.45—LIQUEFIED PETROLEUM GAS

§ 25.45–1 *Prohibited on vessels carrying passengers for hire.* (a) On vessels carrying passengers for hire, the use of liquefied petroleum gases and certain inflammable liquids for cooking, heating, or lighting is prohibited by Parts 146 and 147 of Subchapter N (Explosives or other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

PART 26—OPERATIONS

3. Part 26 is amended to read as follows:

SUBPART 26.01—APPLICATION

Sec.
26.01–1 Applicable to all vessels.

SUBPART 26.05—PENALTIES

26.05–1 General.
26.05–5 Reckless operation.

SUBPART 26.10—MITIGATION OR REMISSION OF FINES OR PENALTIES

26.10–1 Procedure.

SUBPART 26.15—BOARDING OFFICERS

26.15–1 May board at any time.

SUBPART 26.20—EXHIBITION OF MOTORBOAT OPERATOR'S LICENSE

26.20–1 Must be available.

SUBPART 26.25—LICENSED PERSONNEL IN CHARGE

26.25–1 Licensed personnel required.

AUTHORITY: §§ 26.01–1 to 26.25–1 issued under R. S. 4405, as amended, 4462, as amended, sec. 17, 54 Stat. 166, as amended; 46 U. S. C. 375, 416, 526p.

SUBPART 26.01—APPLICATION

§ 26.01–1 *Applicable to all vessels.* (a) The provisions of this part shall apply to all vessels except as specifically noted.

SUBPART 26.05—PENALTIES

§ 26.05–1 *General.* (a) If any motorboat or motor vessels subject to any of the provisions of the Motorboat Act of April 25, 1940, as amended (54 Stat. 163–167; 46 U. S. C. 526–526t), is operated or navigated in violation of said Act or any of the applicable regulations in this chapter, the owner or operator, either one or both of them are subject to the following penalty:

SEC. 16. If any motorboat or vessel subject to any of the provisions of this Act is operated or navigated in violation of this Act or any regulation issued thereunder, the owner or operator, either one or both of them, shall, in addition to any other penalty prescribed by law than that contained in section 14 of this Act, be liable to a penalty of $100: *Provided*, That in the case of motorboats or vessels subject to the provisions of this Act carrying passengers for hire, a penalty of $200 shall be imposed on the owner or operator, either one or both of them, thereof for any violation of section 6, 7, or 8 of this Act or of any regulations pertaining thereto. For any penalty incurred under this section the motorboat or vessel shall be held liable and may be proceeded against by way of libel in the district court of any district in which said motorboat or vessel may be found. (Apr. 25, 1940, sec. 16; 54 Stat. 166; 46 U. S. C. 526o.)

§ 26.05–5 *Reckless operation.* (a) Any person who shall operate a motorboat or any vessel in a reckless or negligent manner is subject to the following penalty:

SEC. 14. Any person who shall operate any motorboat or any vessel in a reckless or negligent manner so as to endanger the life, limb, or property of any person shall be deemed guilty of a misdemeanor and on conviction thereof by any court of competent jurisdiction shall be punished by a fine not exceeding $2,000, or by imprisonment for a term of not exceeding one year, or by both such fine and imprisonment, at the discretion of the court. (Apr. 25, 1940, sec. 14; 54 Stat. 166; 46 U. S. C. 526m.)

SUBPART 26.10—MITIGATION OR REMISSION OF FINES OR PENALTIES

§ 26.10–1 *Procedure.* (a) The Commandant or any officer of the Coast Guard authorized by the Commandant may, upon application therefor, remit or mitigate any fine, penalty, or forfeiture incurred under the Motorboat Act of April 25, 1940, or any of these regulations except the penalties provided for in section 14 of said act.[1] The application should be in such form and filed in such manner as prescribed by the Commandant. For details see §§ 2.50–20 to 2.50–30, inclusive, in Subchapter A (Procedures Applicable to the Public) of this chapter.

SUBPART 26.15—BOARDING OFFICERS

§ 26.15–1 *May board at any time.* (a) Officers duly authorized to enforce the navigation laws of the United States are authorized to board all motorboats and motor vessels for the purpose of determining and reporting violations of the Motorboat Act of April 25, 1940, and the regulations in this subchapter.

SUBPART 26.20—EXHIBITION OF MOTORBOAT OPERATOR'S LICENSE

§ 26.20–1 *Must be available.* (a) Any person to whom a license as a motorboat operator has been issued shall have such license in his possession and available for immediate production to any Coast Guard boarding officer at all times during which any vessel which he is operating is carrying passengers for hire.

SUBPART 26.25—LICENSED PERSONNEL IN CHARGE

§ 26.25–1 *Licensed personnel required.* (a) All vessels shall be under the charge of licensed personnel as required by Subchapter P (Manning of Vessels) of this chapter.

PART 27—REQUIREMENTS FOR MOTORBOATS AND MOTOR VESSELS OF MORE THAN 15 GROSS TONS CARRYING PASSENGERS FOR HIRE

4. Part 27 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 28—SPECIFICATIONS AND PROCEDURE FOR APPROVAL OF EQUIPMENT

5. Part 28 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 29—NUMBERING OF UNDOCUMENTED VESSELS

6. Part 29 is canceled. (The text of this part is revised and transferred to Part 172.)

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

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[1] Section 6, 7, and 8 require, respectively, life preservers, licensed operators for motorboats carrying passengers for hire, and fire extinguishers.

Subchapter D—Tank Vessels

PART 30—GENERAL PROVISIONS

Section 30.01–5 is amended to read as follows:

§ 30.01–5 *Application of regulations—TB/ALL.* (a) The regulations in this subchapter contain requirements for materials, design, construction, inspection, manning, and operation of tank vessels, including handling and stowage of cargo and duties of officers and crew. However, vessels certificated as cargo or passenger vessels, where the principal purpose or use of vessel is not for the carriage of inflammable or combustible liquid cargo in bulk, may be granted a permit to carry Grade E liquid cargo in bulk in the case of passenger vessels and Grade D or E liquid cargo in bulk in the case of cargo vessels.

(b) The requirements of this subchapter are divided into parts as follows:

(1) Inspection and certification.
(2) Special equipment, machinery, and hull requirements.
(3) Lifesaving appliances.
(4) Fire-fighting equipment.
(5) Operations.
(6) Liquefied petroleum gases.
(7) Combustible or inflammable liquids with lethal qualities.

(c) The vessels and services to which each regulation applies are indicated by letters in the heading of the section or paragraph. The first letter or two letters indicate the type of vessel and the letter or letters following the oblique line indicate the waters in which such vessels may operate. These letters are described as follows:

(1) "T" signifies a tank ship.

(2) "B" signifies a tank barge when it precedes an oblique line; or it signifies service on bays, sounds, and lakes other than the Great Lakes when it follows an oblique line.

(3) "ALL" signifies service on all waters.

(4) "O" signifies service on ocean waters.

(5) "C" signifies services on coastwise waters.

(6) "L" signifies service on Great Lakes' waters.

(7) "R" signifies service on river waters.

(d) This subchapter shall be applicable to all United States flag vessels indicated in Column 3 of Table 30.01–5(d), except as follows:

(1) Any vessel operating exclusively on inland waters which are not navigable waters of the United States.

(2) Any vessel while laid up and dismantled and out of commission.

(3) With the exception of vessels of the U. S. Maritime Administration, any vessel with title vested in the United States and which is used for public purposes.

TABLE 30.01–5 (d)

Method of propulsion	Size or other limitations	Classes of vessels (including motorboats) examined or inspected under various Coast Guard regulations			
		Vessels inspected and certificated under Subchapter D—Tank Vessels [1]	Vessels inspected and certificated under Subchapter H—Passenger Vessels [1 2]	Vessels inspected and certificated under Subchapter I—Cargo and Miscellaneous Vessels [1 2]	Vessels subject to provisions of Subchapter C—Uninspected Vessels [1 2 3]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	Vessels 40 feet in length and under.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tugboats and towboats	All vessels except those covered by Subchapters D and I.
	Vessels over 40 but not over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tugboats and towboats	All vessels except those covered by Subchapters D and I.[5]
Steam	Vessels over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew. 3. Towing and fishing vessels, in other than ocean and coastwise service, issued a permit to carry persons on the legitimate business of the vessel, in addition to the crew, but not to exceed one for each net ton of the vessel.	All vessels except those covered by Subchapters D and H.	None.
Motor	Vessels of not over 15 gross tons.	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	None	All vessels except those covered by Subchapter D.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage, except yachts, and all other vessels carrying passengers for hire except documented cargo vessels over 65 feet in length issued a permit to carry not more than 16 persons in addition to the crew.	All vessels carrying freight for hire except those covered by Subchapters D and H.	All vessels except those covered by Subchapters D, H, and I.
	Seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew.	All vessels except those covered by Subchapters D and H, and those engaged in the fishing, oystering, clamming, crabbing, or any other branch of the fishery, kelp, or sponge industry.	All vessels except those covered by Subchapters D, H, and I.
Sail		All vessels carrying combustible or inflammable liquid cargo in bulk.	All vessels over 700 gross tons carrying passengers for hire.	None	None.
Non-self propelled.	Seagoing barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges 100 gross tons and over carrying passengers.	All barges 100 gross tons and over except those covered by Subchapters D and H.	All barges carrying passengers except those covered by Subchapter H.
	Inland barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges over 100 gross tons carrying passengers for hire.	None	All barges carrying passengers except those covered by Subchapter H.

[1] Subchapters E (Load Lines), F (Marine Engineering), and J (Electrical Engineering) of this chapter are also applicable under certain conditions.

[2] Public nautical school ships, other than vessels of the Navy and Coast Guard, shall meet the requirements of Part 167 of Subchapter R (Nautical Schools) of this chapter. Civilian nautical school ships, as defined by 46 U. S. C. 1331, shall meet the requirements of Subchapter H (Passenger Vessels) and Part 168 of Subchapter R (Nautical Schools) of this chapter.

[3] Any vessel on an international voyage is subject to the applicable requirements of the International Convention for the Safety of Life at Sea, 1948.

[4] Length measured from end to end over deck, excluding sheer.

[5] Boilers and machinery are subject to examination.

[6] Vessels covered by Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter, where the principal purpose or use of the vessel is not for the carriage of liquid cargo, may be granted a permit to carry a limited amount of combustible liquid cargo in bulk. The portion of the vessel used for the carriage of the combustible liquid cargo shall meet the requirements of Subchapter D (Tank Vessels) in addition to the requirements of Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter.

(e) This subchapter shall be applicable to all foreign flag vessels indicated in Column 3 of Table 30.01–5(d) while in the navigable waters of the United States insofar as meeting the general intent of the safety and cargo handling requirements set forth in Subparts 35.30 and 35.35 of this subchapter. Further, such vessels that carry 12 or less passengers from any port of the United States shall be subject to the provisions of this subchapter to the extent prescribed by law except as follows:

(1) Any vessel of a foreign nation signatory to the International Convention on Safety of Life at Sea, 1948, and which has on board a current, valid Safety Equipment Certificate.

(2) Any vessel of a foreign nation having inspection laws approximating those of the United States together with reciprocal inspection arrangements with the United States, and which has on board a current, valid certificate of inspection issued by its government under such arrangements.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

PART 31—INSPECTION AND CERTIFICATION

SUBPART 31.10—INSPECTIONS

1. Section 31.10–1 is amended to read as follows:

§ 31.10–1 *Recognized classification society—TB/ALL.* (a) In the inspection of hulls, boilers, and machinery, the current standards established by the American Bureau of Shipping and designated "Rules for Building and Classing Steel Vessels" respecting material and construction of hulls, boilers, and machinery, except as otherwise provided for by law and regulations in this chapter, shall be accepted as standard by the Coast Guard.

(b) The current standards established by the American Bureau of Shipping in effect at the time of construction of the vessel, or otherwise as applicable, shall be used. The book "Rules for Building and Classing Steel Vessels" is usually published annually and may be purchased from the American Bureau of Shipping, 45 Broad Street, New York 4, New York. These standards may be also examined at the office of the Commandant (M), U. S. Coast Guard, Washington, D. C., or at the office of any Coast Guard District Commander or Officer in Charge, Marine Inspection.

(c) The approved plans and certificate of the American Bureau of Shipping, or other recognized classification society for classed vessels, may be accepted by the Coast Guard as evidence of the structural efficiency of the hull and reliability of machinery of vessels subject to the regulations in this subchapter, except as otherwise provided for by laws and regulations in this chapter.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

2. Section 31.10–20 (a) is amended to read as follows:

§ 31.10–20 *Drydocking or hauling out—TB/ALL.* (a) Each steel hull tank vessel shall be placed in drydock or on a slipway or hauled out for examination depending upon its service, as follows:

(1) Each tank vessel whose operations in salt-water service aggregate more than 6 months in a calendar year shall be drydocked or hauled out at least once each calendar year.

(2) Each tank vessel whose operations in salt-water service aggregate 6 months or less in a calendar year shall be drydocked or hauled out at least once in every 2 calendar years.

(3) Each tank ship used in fresh water service exclusively shall be drydocked or hauled out at least once in every 5 calendar years.

(4) Tank barges used in fresh water service exclusively need not be drydocked or hauled out during the first 5 calendar years after date of build, but shall be drydocked or hauled out between that time and the end of the tenth calendar year after date of build, and once in every 5 calendar years thereafter.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

3. Section 31.10–30 is amended to read as follows:

§ 31.10–30 *Stability test—TB/ALL.* When the Officer in Charge, Marine Inspection, has reason to question the stability of any tank vessel under his jurisdiction, he shall require the owners of the tank vessel to make a stability test of such vessel.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

4. Part 31 is amended by adding a new § 31.10–31 reading as follows:

§ 31.10–31 *Stability tests—T/OC.* Each mechanically propelled tank ship of 500 gross tons and over, construction or conversion of which was started on or after November 19, 1952, shall be subjected to a stability test. A stability letter prepared by the Coast Guard and embodying the necessary instructions to insure maintenance of sufficient intact stability at all times shall be posted under glass in the pilothouse. The Commandant may allow the stability test of a ship to be dispensed with provided basic stability data are available from the stability test of a sister ship and it is shown to the satisfaction of the Commandant that reliable stability information for the exempted ship can be obtained from such basic data.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

PART 32—SPECIAL EQUIPMENT, MACHINERY, AND HULL REQUIREMENTS

SUBPART 32.10—COOKING OR HEATING EQUIPMENT

Subpart 32.10, consisting of §§ 32.10–1 to 32.10–45 is cancelled.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 32.15—NAVIGATION EQUIPMENT

Part 32 is amended by adding §§ 32.15–20 and 32.15–25 reading as follows:

§ 32.15–20 *Radiotelegraph—T/ALL.* Radiotelegraph installations are required on certain tank ships. Details of the application of this requirement, as well as the details of the installation, shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission.

§ 32.15–25 *Radio direction finder—T/OC.* All tank ships of 1,600 gross tons and over on an international voyage or in ocean service shall be fitted with a radio direction finder. Details of the installation shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission. Such tank ships of over 1,600 gross tons, but not over 5,000 gross tons, construction or conversion of which was started prior to November 19, 1952, need not meet the requirements of this section until November 19, 1954.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 32.35—MAIN AND AUXILIARY MACHINERY

Sections 32.25–1 to 32.35–25, inclusive, are cancelled; and new regulations designated §§ 32.35–1 to 32.35–15, inclusive, are added reading as follows:

Sec.
32.35–1 Boilers and machinery—TB/ALL.
32.35–5 Installation of internal combustion engines—TB/ALL.
32.35–10 Steering apparatus on tank vessels—TB/ALL.
32.35–15 Communication—T/ALL.

AUTHORITY: §§ 32.35–1 to 32.35–15 issued under R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, as amended; 50 U. S. C., App., 1275.

§ 32.35–1 *Boilers and machinery—TB/ALL.* Boilers, main and auxiliary machinery, and piping systems shall conform to the requirements of Subchapter F (Marine Engineering) of this chapter, except as otherwise provided for in this subchapter.

§ 32.35–5 *Installation of internal combustion engines—TB/ALL.* Each internal combustion engine located on the weather deck shall be provided with a ventilated metal hood or, where space permits, with a well-ventilated metal housing of sufficient size to allow for proper operation and maintenance.

§ 32.35–10 *Steering apparatus on tank vessels—TB/ALL.* Tank vessels shall be provided with steering apparatus as required by Subpart 57.25 of Subchapter F (Marine Engineering) of this chapter.

§ 32.35–15 *Communication — T/ALL.* Efficient means of communication shall be provided between the pilothouse, the emergency steering station, and the steering engine room.

SUBPART 32.45—ELECTRICAL INSTALLATIONS

Section 32.45–5 is amended to read as follows:

§ 32.45–5 *General installation requirements—TB/ALL.* (a) Where practicable, electrical cable is to be located

well inboard from the sides, preferably along or near the centerline, to reduce the risk of injury in the event of collision, but it shall be kept clear of cargo tank openings. Except where Grade E liquids only are involved, feeders shall be run as far as practicable to avoid cargo pump rooms and enclosed spaces immediately adjoining cargo tanks.

(b) The armor on all cables shall be electrically and mechanically continuous.

(c) Except where Grade E liquids only are involved, switchboards, distributing panels, switches, fuses, and other current-interrupting devices shall not be fitted in cargo pump rooms or enclosed spaces immediately adjoining cargo tanks.

(d) Portable extension cables and fittings are to be of an approved type.

(e) Main distribution circuits shall be protected against overload by circuit breaking devices, the capacity of which shall be marked at each such device.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 32.50—PUMPS, PIPING, AND HOSE FOR CARGO HANDLING

Sections 32.50–5 to 32.50–20, inclusive, are amended to read as follows:

Sec.

32.50–5 Cargo pump fittings and controls on tank vessels constructed on or after November 10, 1936—TB/ALL.
32.50–10 Cargo pumps on tank vessels with independent cargo tanks which were constructed prior to November 10, 1936—TB/ALL.
32.50–15 Cargo piping on tank vessels constructed on or after July 1, 1951—TB/ALL.
32.50–20 Cargo piping for tank vessels constructed between November 10, 1936, and July 1, 1951—TB/ALL.

AUTHORITY: §§ 32.50–5 to 32.50–20 issued under R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, as amended; 50 U. S. C., App., 1275.

§ 32.50–5 *Cargo pump fittings and controls on tank vessels constructed on or after November 10, 1936—TB/ALL.* (a) On all tank vessels, the construction or conversion of which is started on or after November 10, 1936, where a cargo pump is capable of developing a pressure exceeding 125 pounds at the pump under shut-off head conditions (based on water), a suitable relief valve shall be installed between the pump and shut-off valve in the cargo pump discharge and piped back into the suction. The relief valve setting shall not exceed the pressure for which the piping system is designed.

(b) A pressure gage shall be installed for each pump discharge, and it shall be located at a point visible with respect to the pump controls.

§ 32.50–10 *Cargo pumps on tank vessels with independent cargo tanks which were constructed prior to November 10, 1936—TB/ALL.* (a) Cargo pumps on tank vessels, the construction or conversion of which was started prior to November 10, 1936, may be located in a hold space containing independent cargo tanks or on deck. If the pump driving unit is of the type permitted in cargo pump rooms, it also may be located in the hold space. If other types of driving units are used, they shall be located on deck or in an engine compartment. If the pump drive shaft passes through decks or bulkheads into a hold space or pump room, it shall be provided with suitable stuffing boxes at such points.

§ 32.50–15 *Cargo piping on tank vessels constructed on or after July 1, 1951—TB/ALL.* (a) On all tank vessels, the construction or conversion of which is started on or after July 1, 1951, the cargo piping shall be:

(1) A fixed cargo piping system shall be installed on a tank vessel carrying Grade A, B or C cargo. The piping shall be arranged so as to avoid excessive stresses at the joints. For sizes exceeding 2 inches in diameter, flanged, welded, or other approved types of joints shall be employed. Packing material shall be suitable for the cargo carried. Connections at bulkheads shall be made so that the plating does not form part of a flanged joint. Piping may be carried through bunker spaces and deep tanks provided it is run through a pipe tunnel. The tunnel may be omitted where the pipe is extra heavy, all joints are welded, and bends are installed to provide for expansion and contraction.

(2) Cargo piping, where installed in tank vessels carrying Grade D or E cargo only, shall conform with the requirements contained in subparagraph (1) of this paragraph.

(3) Cargo piping shall not pass through spaces containing machinery where sources of vapor ignition are normally present: *Provided,* That, in special cases the Commandant may permit the piping to pass through such spaces if Grade E liquids only are involved.

(b) Valve operating rods in cargo tanks shall be solid, except that tank barges having plug cocks inside the cargo tanks may have operating rods of extra heavy pipe with the annular space between the lubricant tube and the pipe wall sealed with a nonsoluble material to prevent penetration of the cargo. Valve operating rods shall be of ample size, well guided and supported, and attached to the valve stems in a manner so as to to prevent the operating rods from working loose. Where the operating rods pass through a deck, gastight stuffing boxes shall be fitted. The leads of operating rods shall be as direct as possible. Valves shall be of suitable design for the intended service.

(c) All cargo loading and discharge hose connections shall be fitted with valves or blind flanges.

§ 32.50–20 *Cargo piping for tank vessels constructed between November 10, 1936, and July 1, 1951—TB/ALL.* (a) On tank vessels, the construction or conversion of which is started on or after November 10, 1936, and prior to July 1, 1951, the piping shall be arranged so as to avoid excessive stresses at the joints. For sizes exceeding 2 inches in diameter, flanged, welded, or other approved types of joints shall be employed. Packing material shall be suitable for the cargo carried. Connections at bulkheads shall be made so that the plating does not form part of a flanged joint. Piping may be carried through bunker spaces and deep tanks provided it is run through a pipe tunnel. The tunnel may be omitted where the pipe is extra heavy, all joints are welded, and bends are installed to provide for expansion and contraction.

(b) Cargo piping shall not pass through spaces containing machinery where sources of vapor ignition are normally present: *Provided,* That in special cases the Commandant may permit the piping to pass through such spaces if Grade E liquids only are involved.

(c) Valve operating rods in the cargo tanks shall be solid and of ample size, well guided and supported, and attached to the valve stems in a manner to guard against their working loose. Where such valve rods pass through the deck, gastight stuffing boxes shall be fitted. The leads of valve rods shall be as direct as possible. All valves and fittings shall be of material, design, and manufacture for the intended service on the cargo system; either rising or nonrising stem valves may be used.

SUBPART 32.52—BILGE SYSTEMS

Part 32 is amended by adding a new Subpart 32.52, consisting of §§ 32.52–1 to 32.52–10, inclusive, reading as follows:

Sec.

32.52–1 Bilge pumps on tank vessels constructed or converted on or after November 19, 1952—TB/ALL.
32.52–5 Bilge piping for pump rooms and adjacent cofferdams on tank vessels constructed or converted on or after November 19, 1952—TB/ALL.
32.52–10 Bilge pumps and piping on tank vessels constructed or converted prior to November 19, 1952—TB/ALL.

AUTHORITY: §§ 32.52–1 to 32–52–10 issued under R. S. 4405, as amended, 4417a, as amended, 4462, as amended. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275.

§ 32.52–1 *Bilge pumps on tank vessels constructed or converted on or after November 19, 1952—TB/ALL.* The number and arrangement of bilge pumps on each tank vessel shall conform to the requirements of Subchapter F (Marine Engineering) of this chapter, except as hereinafter provided in this subpart.

§ 32.52–5 *Bilge piping for pump rooms and adjacent cofferdams on tank vessels constructed or converted on or after November 19, 1952—TB/ALL.* (a) Provisions shall be made for removing drainage from the pump room bilges and adjacent cofferdams. A separate bilge pump, ejector, or bilge suction from a cargo pump or cargo stripping pump may be provided for this purpose. The bilge pump shall not be located in nor shall the piping pass through spaces containing machinery where sources of vapor ignition are normally present.

(b) Where a bilge suction is provided from a cargo or stripping pump, a stop-check valve shall be fitted in the suction branch, and an additional stop valve shall be fitted also if the bilge suction branch can be subjected to a head of oil from the filling line.

(c) Means shall be provided for controlling the cargo or pump room bilge

pumps and their suctions or discharges in order that a flooded pump room may be pumped out. Suitable portable or manually operated pumps may be accepted as complying with this provision, or alternatively, the pump controls shall be arranged so that they are operable from inside the pump room and either from an accessible position outside the pump room, or from the pump room casing above the freeboard deck.

§ 32.52–10 *Bilge pumps and piping on tank vessels constructed or converted prior to November 19, 1952—TB/ALL.* (a) On tank vessels, the construction or conversion of which was started prior to November 19, 1952, bilge pumps and piping which do not fully comply with the regulations of this subchapter shall be made as nearly equal to the requirements for tank vessels constructed on or after November 19, 1952, as is necessary in the interest of safety.

(b) Bilge suctions from hold spaces containing independent cargo tanks may be connected to cargo pumps or stripping pumps, provided the installation complies with the requirements of § 32.52–5 (b).

SUBPART 32.55—VENTILATION AND VENTING

1. Sections 32.55–20 to 32.55–30, inclusive, are amended to read as follows:

Sec.

32.55–20 Venting of cargo tanks of tank ships constructed on or after July 1, 1951—T/ALL.

32.55–25 Venting of cargo tanks of tank barges constructed on or after July 1, 1951—B/ALL.

32.55–30 Venting of cargo tank of tank vessels constructed between November 10, 1936, and July 1, 1951—TB/ALL.

AUTHORITY: §§ 32.55–20 to 32.55–30 issued under R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, as amended; 50 U. S. C., App., 1275.

§ 32.55–20 *Venting of cargo tanks of tank ships constructed on or after July 1, 1951—T/ALL*—(a) *Venting required.* (1) On all tank ships, the construction or conversion of which is started on or after July 1, 1951, each cargo tank shall be equipped with a vent. The diameter of a vent shall be not less than 2½ inches.

(2) In any case where a venting system is required for a particular grade of liquid, the venting system permitted for a higher grade of liquid may be used instead.

(b) *Grade A liquids.* (1) Cargo tanks in which Grade A liquids are to be transported shall be fitted with a venting system consisting of a branch vent line from each cargo tank connected to a vent header which shall extend to a height above the weather deck equal to at least one-third the beam of the vessel and shall terminate at a comparable distance from any other living or working space, ventilator inlet, or source of ignition. When special conditions will prevent the vent line or header outlets being permanently installed at a height above the deck of one-third the beam of the vessel, then an adjustable system shall be provided which, when extended vertically, shall be capable of reaching a height of one-third the beam of the vessel.

(2) A weather hood may be installed at the vent outlet providing it is of such design as not to direct the flow of vapor below the horizontal.

(3) The branch vent lines shall consist of either:

(i) Pipe with no valves or other hindrances to a free flow of gas; or,

(ii) Piping fitted with a pressure vacuum relief valve, provided means are supplied for relieving all internal pressure on cargo tanks by fitting the valve with a positive means for opening its pressure valve to allow free passage of gases through the branch vent line or by the installation of a by-pass fitted with a manually operated stop valve.

(4) The vent header shall be fitted with a flame arrester or pressure vacuum relief valve. If a pressure vacuum relief valve is used in the header, means shall be provided for relieving all internal pressure on cargo tanks by fitting the valve with a positive means for opening its pressure valve to allow free passage of gases through the header or by the installation of a by-pass fitted with a manually operated stop valve. A suitable means of relieving pressure shall be fitted in the header in order to prevent excess pressure being built up in the tanks, in the event of overfilling of the latter. The vent header system shall be provided with suitable connections for flushing and draining. The vent header system shall be of sufficient capacity as to be able to carry off all displaced air and vapors during loading of the cargo tanks without opening of ullage plates, cargo hatches, etc. See § 32.20–20 for liquid level gaging requirements.

(c) *Grade B or C liquids.* Cargo tanks in which Grade B or C liquids are to be transported shall be fitted with either individual pressure-vacuum relief valves which shall extend to a reasonable height above the weather deck or shall be fitted with a venting system consisting of branch vent lines connected to a vent header which shall extend to a reasonable height above the weather deck and be fitted with a flame arrester or a pressure-vacuum relief valve at the outlet to the atmosphere. The vent header system, if fitted shall be provided with suitable connections for flushing and draining, and if desired, stop valves may be placed in the individual branch vent lines provided that each such stop valve is bypassed by a pressure-vacuum relief valve.

(d) *Grade D or E liquids.* Cargo tanks in which Grade D or E liquids only are to be transported shall be fitted with gooseneck vents and flame screens.

§ 32.55–25 *Venting of cargo tanks of tank barges constructed on or after July 1, 1951—B/ALL.*—(a) *Venting required.* (1) On all tank barges, the construction or conversion of which is started on or after July 1, 1951, each cargo tank shall be equipped with a vent. The diameter of a vent shall be not less than 2½ inches.

(2) In any case where a venting system is required for a particular grade of liquid, the venting system permitted for a higher grade of liquid may be used instead.

(b) *Grade A, B, or C liquids.* Cargo tanks in which Grade A, B, or C liquids are to be transported shall be fitted with either individual pressure-vacuum relief valves which shall extend to a reasonable height above the weather deck or shall be fitted with a venting system consisting of branch vent lines connected to a vent header which shall extend to a reasonable height above the weather deck and be fitted with a pressure-vacuum relief valve at the outlet to the atmosphere. The vent header system, if fitted, shall be provided with suitable connections for flushing and draining, and if desired, stop valves may be placed in the individual branch vent lines: *Provided,* That each such stop valve is bypassed by a pressure-vacuum relief valve.

(c) *Grade D or E liquids.* Cargo tanks in which Grade D or E liquids only are to be transported shall be fitted with gooseneck vents and flame screens.

§ 32.55–30 *Venting of cargo tanks of tank vessels constructed between November 10, 1936, and July 1, 1951—TB/ALL*—(a) *Venting required.* On all tank vessels, the construction or alteration of which is started on or after November 10, 1936, and prior to July 1, 1951, each cargo tank shall be equipped with a vent. The details of the venting system shall meet the requirements of this section, or alternatively, the requirements of either § 32.55–20 or § 32.55–25, as applicable, shall be met.

(b) *Grade A liquids.* (1) Cargo tanks in which Grade A liquids are to be transported shall be fitted with a venting system consisting of branch vent line from each cargo tank connected to a vent header which shall extend to a reasonable height above the weather deck and be fitted with a flame arrester or pressure-vacuum relief valve. Each branch vent line may be provided with a manually operated control valve, provided it is bypassed with a pressure-vacuum relief valve or each cargo tank to which such a branch vent line is connected is fitted with an independent pressure-vacuum relief valve. The vent header system shall be provided with suitable connections for flushing and draining.

(2) In barges with independent tanks carrying Grade A liquids, separate discharge pipes may be fitted to each pressure-vacuum relief valve, or the pressure-vacuum relief valve may be elevated, so that in either case the discharge from such valve will not be less than 7 feet above the deck where practicable.

(c) *Grade B or C liquids.* Cargo tanks in which Grade B or C liquids are to be transported shall be fitted with individual pressure-vacuum relief valves or shall be fitted with a venting system consisting of branch vent lines connected to a vent header which shall extend to a reasonable height above the weather deck and be fitted with a flame arrester or a pressure-vacuum relief valve at the outlet to the atmosphere.

(d) *Grade D or E liquids.* Cargo tanks in which Grade D or E liquids only are

to be transported shall be fitted with gooseneck vents and flame screens unless such tanks are vented by pressure-vacuum relief valves or a venting system of branch vent lines and a vent header.

2. Section 32.55–45 is amended to read as follows:

§ 32.55–45 *Venting of cofferdams of tank vessels constructed on or after November 10, 1936—TB/ALL.* On all tank vessels, the construction or conversion of which was started on or after November 10, 1936, cofferdams shall be provided with gooseneck vents fitted with a flame screen or pressure-vacuum relief valves. The diameter of a vent shall be not less than 2½ inches.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 32.60—HULL REQUIREMENTS FOR TANK VESSELS CONSTRUCTED ON OR AFTER JULY 1, 1951

1. Section 32.60–10 is amended by adding a new paragraph (e) reading as follows:

§ 32.60–10 *Segregation of cargo; Grade A, B, C, or D—TB/ALL.* • • •

(e) *Openings.* Except as provided in paragraph (c) of this section, there shall be no manholes or other openings from cargo tanks to any other enclosed spaces. Any vents, sounding tubes, and similar piping passing through such tanks shall be run in a suitable trunk.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

2. Section 32.60–30 (a) is amended to read as follows:

§ 32.60–30 *Tank vessels with independent tanks—TB/ALL.* (a) Independent cargo tanks may be located in hold spaces or in other cargo tanks; however, a working space of at least 15 inches shall be maintained around each independent tank, or else provisions shall be made for moving such tanks to furnish such working space, except that less than 15 inches around such tanks may be permitted if in the judgment of the Officer in Charge, Marine Inspection, having jurisdiction, a satisfactory inspection of the cargo tanks and hull structure can be made.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

3. Section 32.60–40 is amended to read as follows:

§ 32.60–40 *Construction and testing of cargo tanks and bulkheads—TB/ALL.* (a) All cargo tanks vented at gage pressure of 4 pounds per square inch or less shall be constructed and tested as required by standards established by the American Bureau of Shipping or other recognized classification society. The design of cargo tanks integral with the hull and vented at a gage pressure exceeding 4 pounds per square inch but not exceeding 10 pounds per square inch gage pressure will be given special consideration by the Commandant.

(b) Cargo tanks vented at a gage pressure exceeding 10 pounds per square inch are considered unfired pressure vessels and shall be of cylindrical or similar design and meet the requirements of Parts 52 through 61 of Subchapter F (Marine Engineering) of this chapter.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

PART 33—LIFESAVING APPLIANCES

SUBPART 33.05—LIFEBOATS, LIFE RAFTS, AND BUOYANT APPARATUS REQUIRED

Sections 33.05–1 to 33.05–10, inclusive, are amended to read as follows:

Sec.

33.05–1 Lifeboats for tank ships; ocean; construction or conversion of which was started prior to November 19, 1952—T/O.
33.05–2 Lifeboats for tank ships; ocean; construction or conversion of which was started on or after November 19, 1952—T/O.
33.05–5 Lifeboats for barges; ocean—B/O.
33.05–10 Lifeboats for tank ships; coastwise; construction or conversion of which was started prior to November 19, 1952—T/C.
33.05–11 Lifeboats for tank ships; coastwise; construction or conversion of which was started on or after November 19, 1952—T/C.

AUTHORITY: §§ 33.05–1 to 33.05–11 issued under R. S. 4405, as amended, 4417a, as amended, 4462, as amended, sec 5, 55 Stat. 244, as amended; 46 U. S. C. 375, 391a, 416, 50 U. S. C. App. 1275.

§ 33.05–1 *Lifeboats for tank ships; ocean; construction or conversion of which was started prior to November 19, 1952—T/O.* (a) All tank ships which normally operate more than 20 miles offshore shall carry a sufficient number of lifeboats on each side to accommodate all persons on board: *Provided,* That such tank ships of 350 feet in length or over, having superstructure amidships and propelling machinery aft shall be provided with at least four lifeboats, one on each side in way of the after accommodations, and one on each side in way of amidship accommodations.

(b) No lifeboat shall be of less than 180 cubic feet measurement.

§ 33.05–2 *Lifeboats for tank ships; ocean; construction or conversion of which was started on or after November 19, 1952—T/O.* (a) All tank ships which normally operate more than 20 miles offshore shall carry a sufficient number of lifeboats on each side to accommodate all persons on board: *Provided,* That such tank ships of 3,000 gross tons and over, having superstructure amidships and propelling machinery aft shall be provided with at least four lifeboats, one on each side in way of the after accommodations, and one on each side in way of amidship accommodations.

(b) No lifeboat shall be less than 24 feet in length, except where owing to the size of the tank ship, or for other reasons, the Commandant may permit smaller lifeboats, but in no case shall they be less than 16 feet in length.

(c) All tank ships of 1,600 gross tons and over shall carry at least one motor-propelled or hand-propelled lifeboat.

§ 33.05–5 *Lifeboats for barges; ocean—B/O.* (a) All tank barges which normally operate more than 20 miles offshore shall carry a sufficient number of lifeboats to accommodate all persons on board.

(b) No lifeboat shall be of less than 125 cubic feet measurement.

§ 33.05–10 *Lifeboats for tank ships; coastwise; construction or conversion of which was started prior to November 19, 1952—T/C.* (a) All tank ships which normally operate 20 miles or less offshore shall carry a sufficient number of lifeboats on each side to accommodate all persons on board.

(b) No lifeboat shall be of less than 180 cubic feet measurement, except by approval of the Commandant.

§ 33.05–11 *Lifeboats for tank ships; coastwise; construction or conversion of which was started on or after November 19, 1952—T/C.* (a) All tank ships which normally operate 20 miles or less offshore shall meet the requirements of § 33.05–2 of this subpart.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

SUBPART 33.10—LIFEBOAT HANDLING EQUIPMENT REQUIREMENTS

Sections 33.10–5 and § 33.10–10 are amended to read as follows:

§ 33.10–5 *Lifeboat winches—TB/ALL.* (a) When lifeboat winches are installed on tank vessels, wire falls shall be provided for each set of davits.

(b) On tank ships of 500 gross tons and over in ocean or coastwise service, construction or conversion of which is started on or after November 19, 1952, lifeboat winches shall be provided for all lifeboats, where the deck on which the lifeboats are carried exceeds 20 feet from the lightest seagoing draft.

(c) Lifeboat winches proposed for use in new installations shall be of an approved type and constructed in accordance with Subpart 160.015 of Subchapter Q (Specifications) of this chapter.

(d) Suitable fabric covers shall be provided, so fitted over exposed mechanisms that ice formations may be readily broken adrift when necessary to operate the lifeboat winch.

(e) Installation: Lifeboat winches shall be so located that the operator can observe the movement of the lifeboat during the lowering operation. The lead of the falls to the lifeboat winch shall be in accordance with § 33.10–10 (g).

(f) Tests: Upon completion of the installation of all lifeboat winches, and before the vessel is certificated for service, the following tests and examinations shall be made in the presence of an inspector:

(1) Swing lifeboat out from chocks and lower to level for loading, at which point the lifeboat shall be loaded with dead weight equivalent to the number of persons allowed (165 pounds per person) together with weight of equipment, plus 10 percent of the total load. The lifeboat should then be lowered to the water, stopping at approximately 6-foot intervals by action of the counterweight alone. During the test the following observations should be made:

(i) Brake action shall be smooth, but positive. Brakes exposed to the weather shall also be tested under the load lowering condition with the braking surface wetted.

(ii) Counterweight shall be capable of stopping and holding the lifeboat when released.

(iii) The lifeboat winch shall be capable of controlling the speed of lowering of the fully equipped lifeboat with its complement of persons on board to not more than 120 feet per minute. In addition, the speed of lowering of the fully equipped lifeboat without its complement of persons shall be not less than 40 feet per minute.

(iv) No part of lowering gear shall show any distress under load.

(v) Deck under lifeboat winch and davits must be of sufficient strength to prevent any undue stress of the deck under load.

(vi) Mechanical davits shall swing to extreme outboard position without slacking the lifeboat winch brake.

(vii) Action of governor brake and lowering speed permitted by same should be noted.

(viii) Determine that falls are of sufficient length to lower to light load line with vessel listed 15 degrees either way.

(2) A report of the results of the installation test covering all the above points shall be recorded.

§ 33.10–10 *Blocks and falls—TB/ALL.* Blocks and falls installed after May 1, 1942, shall conform to the following requirements:

(a) All blocks, falls, fairleads, padeyes, fastenings, etc., used in connection with lifeboat gear shall be designed with a minimum factor of safety of six, based on the maximum working load.

(b) Where lifeboat winches are installed, not more than two-part wire falls shall be used, except in specific cases where three-part wire falls may be accepted. Where lifeboat winches are not used, the falls shall be of manila rope or equivalent but wire rope may not be used.

(c) Wire rope falls of 6 x 19 regular lay filler wire construction prelubricated at the factory with suitable neutral wire rope lubricant shall be accepted as standard. Any other type of wire superior or equally as good as the minimum standard specified may be used.

(d) Falls shall be of such length that the lifeboat may be lowered to the water at the lightest seagoing draft with the vessel listed to 15°.

(e) All ocean and coastwise vessels and all other vessels of over 1,000 gross tons, not fitted with lifeboat winches, shall be provided with covered tubs, boxes, or reels for stowage of falls and with suitable lowering bitts in easily accessible positions; except that all ocean and coastwise, self-propelled vessels of over 1,000 gross tons, not fitted with lifeboat winches for which contracts for construction are let on or after September 2, 1945, shall be fitted with cruciform bitts in such position as will render lowering practicable.

(f) Where more than one lifeboat is served by the same set of davits, if the falls are of manila rope, separate falls shall be provided to serve each lifeboat.

(g) Such blocks as are necessary to allow the falls to lead fair in all positions of the davit shall be fitted. Sheaves for wire rope shall have a diameter at the base of the groove at least equal to 12 times the diameter of the rope.

(h) There shall be ample clearance between the cheeks of blocks in which manila rope is used. The width between the cheeks shall be half an inch greater than the diameter of new ropes when those ropes are 3¾ inches in circumference or greater; blocks for smaller ropes shall be designed with clearance in the same proportion.

(i) Means for lubrication shall be provided for all moving parts of blocks.

(j) Where lifeboat winches are provided on tank vessels, construction or conversion of which was started prior to November 19, 1952, there shall be at least 8 feet between the center of the drum and the center of the nearest sheave.

(k) Where lifeboat winches are provided on tank vessels, construction or conversion of which is started on or after November 19, 1952, the lead sheaves to the drums shall be so located as to provide fleet angles of not more than 8 degrees for grooved drums and not more than 4 degrees for nongrooved drums. By fleet angle is meant the angle included between an imaginary line from the lead sheave perpendicular to the axis of the drum and the line formed by the wire rope when lead from the lead sheave to either extremity of the drum.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interprets or applies sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

SUBPART 33.15—EQUIPMENT FOR LIFEBOATS, LIFE RAFTS, OR BUOYANT APPARATUS

1. Section 33.15–1 is amended to read as follows:

§ 33.15–1 *Tank ship lifeboat equipment; ocean and coastwise—T/OC*—(a) *General.* All lifeboats on tank ships operating on ocean or coastwise routes shall be equipped as set forth in this section. All items other than boathooks shall be stowed in lockers or be suitably lashed to the lifeboat. The stowage shall be such as not to interfere with the releasing gear or impede entry into the lifeboat.

(b) *Bailer.* One bailer of sufficient size and suitable for bailing, with lanyard attached.

(c) *Boathooks.* Two boathooks of clear-grained white ash of suitable length, but not less than 8 feet by 1½ inches in diameter.

(d) *Buckets.* Two galvanized iron buckets of about 2 gallons each, with lanyards attached.

(e) *Compass and mounting.* One efficient liquid compass with not less than a 2-inch card. On and after January 1, 1946, all compasses and mountings for new installations or replacements shall be of an approved type. The Coast Guard specification for such approved type, which requires a card of not less than 3¾ inches in diameter, will be made available upon request.

(f) *Distress signals.* Twelve approved hand red flare distress signals in a watertight container, and 2 approved floating orange smoke distress signals. Service use shall be limited to a period of 3 years from date of manufacture. Distress signals not bearing date of manufacture shall not be carried. For specifications for the above signals, see Subparts 160.021, 160.022, and 160.023 of Subchapter Q (Specifications) of this chapter.

(g) *Ditty bag.* One canvas bag containing sailmaker's palm, needles, sail twine, marline, and marlinspike.

(h) *Drinking cups.* One enameled drinking cup.

(i) *Flashlight.* One approved type I, size No. 3 flashlight together with 3 spare batteries and 2 spare bulbs. A flashlight which obtains its source of energy from other than dry cells may be used provided such flashlight has been approved by the Commandant. For specifications for flashlights, see Subpart 161.008 of Subchapter Q (Specifications) of this chapter. No battery cell shall remain in the flashlight beyond the serviceability date appearing on the cell or its jacket. Approved flashlights not conforming to the requirements in Subpart 161.008 of Subchapter Q (Specifications) of this chapter may be continued in service so long as they are in good and serviceable condition.

(j) *Hatchets.* Two hatchets attached to the lifeboat by individual lanyards and readily available for use, one at each end of the lifeboat. All hatchets provided for use on tank ships shall be of an approved type. For specifications for hatchets, see Subpart 160.013 in Subchapter Q (Specifications) of this chapter. Hatchets provided prior to December 1, 1944, may be continued in service so long as they are in good and serviceable condition.

(k) *Illuminating oil.* One quart illuminating oil in metal container.

(l) *Lantern.* One lantern containing sufficient oil to burn at least 9 hours and ready for immediate use.

(m) *Life line.* A life line or grab line, properly secured the entire length of each side festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12-thread manila rope, and the seine float in each bight shall hang to within 12 inches of the surface of the water when the lifeboat is light.

(n) *Life preservers.* Two life preservers of an approved type. These life preservers are in addition to the vessel's equipment of life preservers.

(o) *Locker.* A suitable locker or box for the storage and preservation of the small items of equipment.

(p) *Mast and sails.* A mast or masts with at least one good sail, colored India Orange (Cable No. 70072, Standard Color Card of America) and proper gear for each, the sail and gear to be protected by a suitable canvas cover. Galvanized wire rope or equivalent corrosion resistant metal stays shall be used. A mast and sail is not required on hand-propelled or motor-propelled lifeboats.

(q) *Matches.* Two boxes of safety matches in a watertight container, and carried in a box secured to the underside of the stern thwart, or stowed in locker.

(r) *Oars.* (1) A single banked complement of oars, two spare oars, and a steering oar with a rowlock or becket, conforming to the requirements in Table 33.15–1 (r).

TABLE 33.15–1 (r)—MINIMUM NUMBER AND LENGTH OF OARS

Length of boat	Number of oars	Spare oars	Total, including steering oar	Rowing oars (feet)	Steering oars (feet)
16 feet and under 18 feet	4	2	7	10	12
18 feet and under 20 feet	4	2	7	11	13
20 feet and under 24 feet	4	2	7	13	14
24 feet and under 28 feet	6	2	9	14	15
28 feet and over	6	2	9	15	16

(2) Motor lifeboats and lifeboats fitted with propellers operated by hand shall be equipped with 4 oars and 1 steering oar.

(s) *Painter.* Two painters of manila rope not less than 2¾ inches in circumference and a length not less than 3 times the distance between the boat deck and the light draft. One shall have a long eye splice and be attached to the thwart with a toggle so that it can be released and the other shall be firmly secured to the stem of the lifeboat and be ready for use.

(t) *Parachute flare distress signals.* Twelve approved parachute red flare distress signals and an approved means of projecting them, all contained in a portable watertight case. Service use of the signals shall be limited to a period of 3 years from date of manufacture. For specifications for the above equipment, see Subparts 160.024, 160.028, and 160.036 in Subchapter Q (Specifications) of this chapter.

(u) *Plugs and pumps.* Each drain hole, fitted with an automatic plug, shall be provided with one cap attached by chain to the lifeboat. Where an automatic plug is not provided, there shall be two plugs to each drain hole attached to the lifeboat by separate chains. Decked lifeboats shall have no plug hole but shall be provided with at least two bilge pumps.

(v) *Propellers (hand-operated).* Lifeboats may be fitted with a hand-operated propeller of an approved type, but all lifeboats, except motor lifeboats, having a capacity of 60 or more persons shall be fitted with a hand-operated propeller of an approved type. For construction of hand-propelling gear see Subpart 160.034 of Subchapter Q (Specifications of this chapter. The hand-propelling gear shall be required in all such lifeboats fitted on new tank ships or as replacements of such lifeboats.

(w) *Provisions.* Two pounds of provisions for each person consisting of hard bread or its equivalent in any approved emergency ration of cereal or vegetable compound. It shall be packaged in hermetically sealed containers of an approved type and stowed in provision lockers or other compartments providing suitable protection. No meat or other ration requiring saline preservative shall be allowed. In addition, there shall be one pound of condensed milk for each person stowed in provision lockers or other compartments providing suitable protection.

(x) *Rowlocks.* One set and a half of rowlocks or thole pins attached to the lifeboats by separate chains.

(y) *Rudder.* One rudder and tiller. For construction of rudder and tiller see § 160.035–3 (t) of Subpart 160.035 of Subchapter Q (Specifications) of this chapter.

(z) *Sea anchor.* One sea anchor of an approved type.

(aa) *Signaling mirrors.* Two signaling mirrors of an approved type.

(bb) *Storm oil.* One container holding 1 gallon of vegetable or animal oil, so constructed that the oil can be easily distributed on the water and so arranged that it can be attached to the sea anchor.

(cc) *Drinking water.* For each person at least 3 quarts of drinking water contained in hermetically sealed cans of an approved type and stowed in the drinking water tanks, lockers, or other compartments providing suitable protection.

(dd) *First-aid kit.* One first-aid kit of an approved type, constructed and fitted in accordance with Subpart 160.041 of Subchapter Q (Specifications) of this chapter.

(ee) *Jackknife.* One approved jackknife, constructed in accordance with Subpart 160.043 of Subchapter Q (Specifications) of this chapter.

(ff) *Heaving line.* Two heaving lines of adequate strength, 10 fathoms in length, and one inch in circumference. They shall be of such quality as to be buoyant after 24 hours submergence.

(gg) *Bilge pump.* One approved bilge pump constructed in accordance with Subpart 160.044 of Subchapter Q (Specifications) of this chapter. They shall be of a size noted in Table 33.15–1 (gg) depending upon the cubic capacity of the lifeboat as determined by the six-tenths rule:

TABLE 33.15–1 (gg)

Capacity of lifeboat, cubic feet		Bilge pump size
Over	Not over	
---	330	1
330	700	2
700	---	3

(hh) *Ladders.* All lifeboats approved to carry more than 60 persons shall be fitted with suitable means to enable persons in the water to climb into the lifeboat.

(ii) *Grab lines.* Unless other approved means are provided to achieve the same purpose, three ½ inch manila grab lines shall be fitted extending from gunwale to gunwale under the keel to enable persons to cling to and climb upon an upturned lifeboat. The ends of each grab line shall be securely attached to the side benches or other permanent part of the lifeboat and each grab line shall be made up with figure eight knots spaced approximately 18 inches apart in order to provide hand grips. Means shall be provided for taking up any slack in the grab lines.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interprets or applies sec. 5, 55 Stat. 244, 245; 50 U. S. C. App. 1275)

2. Part 33 is amended by adding a new § 33.15–3 to read as follows:

§ 33.15–3 *Portable radiotelegraph apparatus—T/OC.* All tank ships of 500 gross tons and over shall be provided with a portable radiotelegraph apparatus complying with the requirements of the Federal Communications Commission. The apparatus shall be kept in the radio room, or the chart room, or other suitable location and shall be immediately available for placement in one of the lifeboats.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

3. Section 33.15–5 (p) is amended to read as follows:

§ 33.15–5 *Tank ship lifeboat equipment; Great Lakes—T/L.* * * *

(p) *Plugs.* Each drain hole, fitted with an automatic plug, shall be provided with one cap attached by chain to the lifeboat. Where an automatic plug is not provided, there shall be two plugs to each drain hole attached to the lifeboat by separate chains.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

4. Section 33.15–10 (j) is amended to read as follows:

§ 33.15–10 *Tank ship lifeboat equipment; bays, sounds, and lakes other than Great Lakes, and Rivers—T/BR.* * * *

(j) *Plugs.* Each drain hole, fitted with an automatic plug, shall be provided with one cap attached by chain to the lifeboat. Where an automatic plug is not provided, there shall be two plugs to each drain hole attached to the lifeboat by separate chains.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

5. Section 33.15–15 (l) is amended to read as follows:

§ 33.15–15 *Tank barge lifeboat equipment; all waters—B/ALL.* * * *

(l) *Plugs.* Each drain hole, fitted with an automatic plug, shall be provided with one cap attached by chain to the lifeboat. Where an automatic plug is not provided, there shall be two plugs to each drain hole attached to the lifeboat by separate chains.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

SUBPART 33.20—STOWAGE OF LIFEBOATS, LIFE RAFTS, AND BUOYANT APPARATUS

Section 33.20–1 is amended to read as follows:

§ 33.20–1 *Davits and launching devices—TB/ALL.* (a) Tank ships of 100 gross tons or more shall be equipped with davits for each lifeboat carried. Only approved mechanical or gravity davits may be installed on such ships constructed on or after November 19, 1952.

(b) Tank ships of less than 100 gross tons and tank barges where lifeboats are carried shall provide means for the launching of such lifeboats by davits or crane or, where the freeboard is less than 6 feet when the vessel has no cargo aboard, by slide.

(c) On all tank ships of 500 gross tons and over in ocean and coastwise service, the following conditions shall be met:

(1) An approved ladder, constructed in accordance with Subpart 160.017 of Subchapter Q (Specifications) of this chapter shall be provided at each set of davits to afford access to the lifeboats when waterborne.

(2) Two lifelines shall be fitted to the davit spans of such length as to reach the water with the vessel at its lightest seagoing draft and listed 15 degrees either way.

(3) Suitable means shall be provided for illuminating the launching gear and the lifeboats during the process of launching the lifeboats from the stowed position until they are waterborne.

(4) Where applicable, means shall be provided outside the machinery space to prevent the discharge of water into the lifeboats while they are being lowered. This shall consist of baffles to deflect the water down the vessel's side, or reach rods or other means to close the discharge openings.

(5) Lifeboats, when stowed on a deck more than 15 feet above the deepest seagoing draft, shall be fitted with skates or other suitable means to facilitate launching against an adverse list of up to 15 degrees. However, skates may be dispensed with if, in the opinion of the Commandant, the arrangements are such as to insure that the lifeboats can be satisfactorily launched without skates.

(d) Lifeboats shall not be placed in the bows of tank ships. They shall be stowed in such positions as to insure safe launching.

(e) Suitable access to the lifeboats shall be provided to enable the crew to prepare the lifeboats for launching.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

SUBPART 33.40—LIFE BUOYS

1. Section 33.40–1, and Table 33.40–1, are amended to read as follows:

§ 33.40–1 *Number required on tank ships—T/LBR.* The minimum number of approved 30-inch life buoys and the minimum number to which approved automatic electric water lights shall be attached are fixed by Table 33.40–1.

(R. S. 4405, as amended, 417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

TABLE 33.40–1—RING LIFE BUOYS REQUIRED

Length of tank ship (feet)	Minimum number of ring life buoys	Minimum number of ring life buoys in column 2 which shall have water lights attached
Column 1	Column 2	Column 3
Under 100	2	1
100 and under 200	4	2
200 and under 300	6	3
300 and under 400	12	4
400 and under 600	16	8
600 and under 800	24	12
800 and over	30	15

2. Part 33 is amended by adding a new § 33.40–2 reading as follows:

§ 33.40–2 *Number required on tank ships—T/OC.* (a) On all tank ships of less than 500 gross tons, the minimum number of approved 30-inch life buoys and the minimum number to which approved automatic electric water lights shall be attached are fixed by Table 33.40–1.

(b) On all tank ships of 500 gross tons and over, the minimum number of approved 30-inch life buoys and the minimum number to which automatic water lights shall be attached are fixed by Table 33.40–2 (b).

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

TABLE 33.40–2 (b)—RING LIFE BUOYS REQUIRED

Length of tank ship (feet)	Minimum number of ring life buoys	Minimum number of ring life buoys in column 2 which shall have water lights attached
Column 1	Column 2	Column 3
Under 300	8	4
300 and under 400	12	6
400 and under 600	16	8
600 and under 800	24	12
800 and over	30	15

SUBPART 33.45—DISTRESS LIGHTS

Section 33.45–5 is amended to read as follows:

§ 33.45–5 *Parachute distress signals—T/OC.* In addition to the equipment required by § 33.45–1, all tank ships of 500 gross tons and over shall be provided with 12 approved hand-held rocket-propelled parachute red flares distress signals, contained in a portable watertight container, constructed in accordance with Subpart 160.036 of Subchapter Q (Specifications) of this chapter. Service use of the distress signals shall be limited to a period of 3 years from date of manufacture.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

SUBPART 33.50—SIGNALING LAMP

Section 33.50–1 is amended to read as follows:

§ 33.50–1 *Signaling lamp—T/OC.* Ocean and coastwise tank ships over 150 gross tons shall be equipped with an approved daylight signaling lamp.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended, 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended, 50 U. S. C. App. 1275)

PART 34—FIRE-FIGHTING EQUIPMENT

Part 34 is amended to read as follows:

SUBPART 34.01—GENERAL FIRE-FIGHTING REQUIREMENTS

Sec.
34.01–1 Fire equipment for tank vessels—TB/ALL.
34.01–5 Repairs and alterations to fire-fighting equipment—TB/ALL.
34.01–10 Special types of fire apparatus may be used—TB/ALL.
34.01–15 Shutting down of boilers and machinery—T/ALL

SUBPART 34.05—INSPECTIONS

34.05–1 Inspection of fire-fighting equipment; general—TB/ALL.
34.05–5 All fire-fighting equipment may be tested—TB/ALL.
34.05–10 Testing of fire hose and pumps—TB/ALL.
34.05–15 Inspection of bilges—TB/ALL.

SUBPART 34.10—FIRE PUMPS, MAINS, HYDRANTS, AND FIRE HOSE FOR TANK SHIPS

34.10–1 Fire pumps required—T/ALL.
34.10–5 Capacity of fire pumps; tank ships of 500 gross tons and over—T/ALL.
34.10–10 Type of fire pumps—T/ALL.
34.10–15 Location of fire pumps—T/ALL.
34.10–20 Fire pump relief valves and piping—T/ALL.
34.10–25 Fire hydrants—T/ALL.
34.10–30 Fire hose—T/ALL.
34.10–35 Fire hose nozzles on tank ships constructed on or after July 1, 1951—T/ALL.
34.10–40 Fire hose nozzles on tank ships constructed prior to July 1, 1951—T/ALL.

SUBPART 34.15—CARGO SPACES ON TANK SHIPS

34.15–1 General requirements for cargo spaces on tank ships constructed or converted on or after November 19, 1952—T/ALL.
34.15–5 General requirements for cargo spaces on tank ships constructed or converted prior to November 19, 1952—T/ALL.
34.15–10 General requirements for fire extinguishing systems—T/ALL.
34.15–15 Steam systems for cargo spaces—T/ALL.
34.15–20 Carbon dioxide or other inert gas system for cargo spaces—T/ALL.
34.15–25 Foam systems for cargo spaces—T/ALL.
34.15–30 Carbon tetrachloride systems for cargo spaces—T/ALL.
34.15–35 Flue gas fire extinguishing systems for cargo spaces—T/ALL.

SUBPART 34.20—BOILER ROOM AND MACHINERY SPACES ON TANK SHIPS

34.20–1 Fixed fire extinguishing systems for boiler rooms and machinery spaces—T/ALL.
34.20–5 General requirements for fixed fire extinguishing systems—T/ALL.

Sec.

34.20-10 Fixed carbon dioxide fire extinguishing systems installed on tank ships on or after November 19, 1952—T/ALL.
34.20-15 Fixed carbon dioxide fire extinguishing systems installed on tank ships prior to November 19, 1952—T/ALL.
34.20-20 Fixed foam fire extinguishing systems—T/ALL.
34.20-25 Fire extinguishing equipment, other than fixed, for boiler and machinery spaces on tank ships—T/ALL.

SUBPART 34.21—PUMP ROOMS ON TANK SHIPS

34.21-1 Fixed fire extinguishing systems for tank ships constructed or converted on or after November 19, 1952—T/ALL.
34.21-5 Fire extinguishing systems for tank ships constructed or converted prior to November 19, 1952—T/ALL.

SUBPART 34.22—LAMP AND PAINT ROOMS AND SIMILAR COMPARTMENTS ON TANK SHIPS

34.22-1 Fireproofing of lamp, oil, and paint rooms—T/ALL.
34.22-5 Fixed fire extinguishing systems for lamp and paint rooms and similar spaces on tank ships constructed or converted on or after November 19, 1952—T/ALL.
34.22-10 Fire extinguishing systems for lamp and paint rooms and similar spaces on tank ships constructed or converted prior to November 19, 1952—T/ALL.

SUBPART 34.25—HAND FIRE EXTINGUISHERS

34.25-1 Hand fire extinguishers; test and approval—TB/ALL.
34.25-5 Hand fire extinguishers; marking—TB/ALL.
34.25-10 Hand fire extinguishers; location—TB/ALL.
34.25-15 Hand fire extinguishers; inspection—TB/ALL.
34.25-20 Hand fire extinguishers; spare charges and parts—TB/ALL.
34.25-25 Hand fire extinguishers; number required on tank ships—T/ALL.
34.25-30 Hand fire extinguishers required on tank vessels of over 15 gross tons using oil as fuel—TB/ALL.

SUBPART 34.30—FIRE AXES

34.30-1 Fire axes required—T/ALL.
34.30-5 Location and use of fire axes—T/ALL.

SUBPART 34.35—SAND BOXES

34.35-1 Sand boxes required on tank vessels using oil as fuel under boilers—TB/ALL.

SUBPART 34.40—FIRE-FIGHTING EQUIPMENT FOR TANK BARGES

34.40-1 Portable extinguishing equipment for cargo spaces—B/ALL.
34.40-5 Hand fire extinguishers for quarters, pump room, and machinery spaces—B/ALL.

AUTHORITY: §§ 34.01-1 to 34.40-5 issued under R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416. Interpret or apply sec. 5, 55 Stat. 244, 245, as amended; 50 U. S. C. App. 1275.

SUBPART 34.01—GENERAL FIRE-FIGHTING REQUIREMENTS

§ 34.01-1 *Fire equipment for tank vessels—TB/ALL.* All tank vessels subject to the regulations in this subchapter shall have fire extinguishers and fire-fighting apparatus in accordance with the regulations in this subchapter, and where required, the equipment shall be constructed in accordance with the regulations contained in the applicable subparts of Subchapter Q (Specifications) of this chapter: *Provided, however,* That all fire extinguishers and fire-fighting apparatus which is of the character that complied with the rules and regulations of the Commandant on vessels in existence at the time the regulations in this subchapter are promulgated, and have been in use on such vessels, may be continued in use so long as such fire extinguishers and such fire-fighting apparatus are found to be in good and workable condition. Where fire extinguishers and fire-fighting apparatus are not found to be in good and workable condition, they shall be repaired or else replaced by fire extinguishers or fire-fighting apparatus of the latest approved type, as required by the regulations in this subchapter and Subchapter Q (Specifications) of this chapter. Where fire extinguishers or fire-fighting apparatus are found to be in good and workable condition, but deficient as to quantity or numbers, the additional quantity or numbers required by the regulations in this subchapter shall be of the latest approved type. Fixed systems which are included in the fire-fighting equipment for tank vessels and which have been in the past approved by the Commandant shall be deemed to comply with the regulations in this subchapter both as to character and quantity, provided such systems are in good and workable condition.

§ 34.01-5 *Repairs and alterations to fire-fighting equipment—TB/ALL.* (a) No extensive repairs or alterations, except in emergency, shall be made to any fire-extinguishing apparatus, or other appliance subject to inspection, without advance notice to the Officer in Charge, Marine Inspection. Such repairs or alterations shall so far as is practicable be made with materials and tested in the manner specified within the regulations in this subchapter and Subchapter Q (Specifications) of this chapter for new construction.

(b) Emergency repairs or alterations shall be reported as soon as practicable to the Officer in Charge, Marine Inspection, where the vessel may call after such repairs are made.

§ 34.01-10 *Special types of fire apparatus may be used—TB/ALL.* Where in this part any special type of appliance, fire extinguishing medium, or arrangement is specified, the Commandant may approve the substitution of any other appliance, fire extinguishing medium, or arrangement, such as, for example, a fixed dry chemical system for a fixed fog system, provided it is first demonstrated to his satisfaction that the substitution is at least as effective as that specified in this part.

§ 34.01-15 *Shutting down of boilers and machinery—T/ALL.* The fire-extinguishing systems provided for in this part which depend for their operation on the ship's boilers or machinery, shall not be required to be immediately available at docks or at anchorages.

SUBPART 34.05—INSPECTIONS

§ 34.05-1 *Inspection of fire-fighting equipment; general—TB/ALL.* (a) At each annual inspection, and at any other time as required in the judgment of the Officer in Charge, Marine Inspection, all fire-fighting equipment on tank vessels shall be inspected.

(b) The examination of the fire-fighting equipment shall be made by inspectors. This applies to fire pumps, hose, chemical fire extinguishers, axes, and steam or gas smothering lines to cargo holds and compartments.

(c) The inspectors shall examine the fire-fighting equipment provided for the fireroom and engine room to ascertain if it conforms to the regulations in this subchapter and that it is in good condition for immediate use.

(d) At the annual inspection or at any other time as required, the inspectors shall examine the water-sprinkling system, when fitted, to ascertain if it is in good condition and ready for immediate use.

§ 34.05-5 *All fire-fighting equipment may be tested—TB/ALL.* During the inspection of fire-fighting equipment, the Officer in Charge, Marine Inspection, may require fire apparatus to be tested; and used, except as provided under §§ 34.15-25 and 34.25-15.

§ 34.05-10 *Testing of fire hose and pumps—TB/ALL.* The inspectors shall examine all pumps, hose, and other fire apparatus and shall see that the hose is subjected to a pressure of 100 pounds to the square inch, and that the hose couplings are securely fastened in accordance with the regulations in this subchapter.

§ 34.05-15 *Inspection of bilges—TB/ALL.* When inspecting oil-burning vessels, either internal-combustion type or steam-driven type, the inspector shall examine the tank tops and bilges in the fireroom and engine room to see that there is no accumulation of oil which might create a fire hazard.

SUBPART 34.10—FIRE PUMPS, MAINS, HYDRANTS, AND FIRE HOSE FOR TANK SHIPS

§ 34.10-1 *Fire pumps required—T/ALL.* All tank ships shall be provided with pumps available for use as fire pumps, as follows:

(a) Tank ships of less than 500 gross tons shall be equipped with an efficient hand pump capable of delivering 50 gallons per minute or a power driven pump of equivalent capacity: *Provided,* That on tank ships of 20 gross tons or under where it is impracticable to install a hand or power operated fire pump, or on tank ships with only one man in the crew, at least one additional 15-pound carbon dioxide or the equivalent fire extinguisher may be accepted in lieu of a fire pump.

(b) Tank ships of 500 gross tons and over, but not over 1,000 gross tons shall be provided with one independently driven power pump.

(c) Tank ships of over 1,000 gross tons shall be provided with two independently driven power pumps.

§ 34.10-5 *Capacity of fire pumps; tank ships of 500 gross tons and over—*

T/ALL. (a) The capacity of the combined fire pump installation shall be one-fifth gallon per minute per gross ton of the ship. The maximum total fire pump capacity required for any tank ship shall be 800 gallons per minute.

(b) Fire pumps on tank ships of 500 gross tons and over shall be capable of delivering two powerful jets of water simultaneously from the highest outlets on the fire main at a Pitot tube pressure of approximately 50 pounds per square inch through nozzles, each having an orifice of not less than ⅞ inch diameter, where the internal diameter of the hose exceeds 1½ inches, and not less than ⅝ inch diameter, where the internal diameter of the hose does not exceed 1½ inches.

(c) While arranged with permanent connections to the fire main the pumps may be utilized also for other purposes, provided that one of the required pumps is kept available for immediate use on the fire system. In no case, however, shall a pump having connection to oil lines be used as a fire pump.

§ 34.10–10 *Type of fire pumps—T/ALL.* Tank ships are not restricted to any particular type or proportions for fire pumps.

§ 34.10–15 *Location of fire pumps—T/ALL.* (a) On oil-burning tank ships, provided with two fire pumps, where the engine and firerooms are not entirely separated by iron or steel bulkheads, or if fuel can drain from fireroom bilges into the engine room, one of the fire pumps shall be located in an accessible space separate from the machinery compartment.

(b) On all tank ships the construction or conversion of which is started on or after November 19, 1952, where 2 fire pumps are required, they shall be located in separate spaces, and the arrangements of pumps, sea connections, and sources of power shall be such as to insure that a fire in any one space will not put all of the fire pumps out of operation. However, where it is shown to the satisfaction of the Commandant that it is unreasonable or impracticable to provide two sources of power due to the size or arrangement of the vessel, or for other reasons, the installation of a total flooding carbon dioxide system may be accepted as an alternate method of extinguishing the fire affecting the powering and operation of at least one of the required fire pumps in lieu of having separate sources of power.

§ 34.10–20 *Fire pump relief valves and piping—T/ALL.* (a) Fire pumps shall be fitted on the discharge side with a relief valve and a pressure gage to indicate the pressure on the fire main. Except when the fire pumps are being used in tank cleaning operations, the relief valves shall be set to relieve at 25 pounds higher than the pressure necessary to maintain the requirements of § 34.10–5 (b) of this part. If the fire pumps operating under shut-off conditions are not capable of producing a pressure exceeding 125 pounds per square inch, the relief valves may be omitted.

(b) Suction pipes for all fire pumps shall be so arranged as to have an area of opening sufficiently large to supply water when the pumps are working at full capacity.

(c) The size of the discharge pipe leading from fire pumps shall in no case be less than that of the discharge opening of the pump, and in no case shall it be less than 1½ inches in internal diameter.

(d) The pipe, valves, fittings, and construction of fire lines shall conform to the requirements contained in Part 55 of Subchapter F (Marine Engineering) of this chapter.

§ 34.10–25 *Fire hydrants—T/ALL.* (a) Fire hydrants shall be of sufficient number and so arranged that any part of the living quarters, weather decks, machinery spaces, stores and working spaces, and any part of cargo decks accessible to the crew while at sea may be reached with 2 streams of water, one of which shall be from a single 50-foot length of hose.

(b) Hose connections shall be brass or composition material.

(c) Outlet openings shall have a diameter of not less than 1½ inches.

(d) All fire hydrants shall be equipped with hose spanners.

(e) The arrangement of the fire hydrant shall be limited to any position from the horizontal to the vertical pointing downward, so that the hose will lead downward or horizontally, in order to minimize the possibility of kinking. In no case will a hydrant arranged in a vertical position with the outlet pointing upward be accepted.

(f) The pipes and hydrants shall be so placed that the fire hose may be easily coupled to them. In ships where deck cargo may be carried, the position of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.

(g) Each fire hydrant shall be equipped with a valve so that the hose may be removed while there is pressure on the fire main.

§ 34.10–30 *Fire hose—T/ALL.* (a) Fire hose shall be connected to the outlet at all times except on open decks, where the location of the fire hydrants is such that no protection is afforded for the hose in heavy weather.

(b) The fire hose may be temporarily removed when it will interfere with the landing of cargo.

(c) Each fire hose shall be provided with a suitable nozzle.

(d) Fire hose, when part of the fire equipment, shall not be used for any other purpose than fire extinguishing, fire drills, and testing.

(e) Fire hose shall be drained and stowed in its proper place immediately after being used.

§ 34.10–35 *Fire hose nozzles on tank ships constructed on or after July 1, 1951—T/ALL.* (a) Where smooth bore type hose nozzles are used, the nozzle orifice size shall be as indicated in § 34.10–5 (b).

(b) On all tank ships of 1,000 gross tons and over, the nozzles used on at least 2 hose lines in the boiler and machinery spaces shall be of approved combination solid stream and water fog nozzles which are capable of producing a solid stream or a high velocity fog, and being shut off. In addition, an approved applicator equipped with a low velocity water fog tip, which is capable of being attached directly to the nozzle or the hose, shall be provided for each nozzle. Unless a self-cleaning strainer is contained within the nozzle itself and within the applicator where the applicator is attached directly to the hose, there shall be a self-cleaning strainer attached to the fire hydrant either directly or by means of a short length of hose.

(c) At least 25 percent of the hydrants, exclusive of those in the boiler and machinery spaces, shall be fitted with approved combination nozzles, applicators with low velocity fog spray heads, and self-cleaning strainers as described in § 34.10–35 (b). Such nozzles shall be strategically located throughout the tank ship.

(d) Where approved combination nozzles are used with fire lines other than required in § 34.10–35 (b) and (c), the applicators with low velocity fog spray heads, and self-cleaning strainers may be fitted but will not be required.

§ 34.10–40 *Fire hose nozzles on tank ships constructed prior to July 1, 1951—T/ALL.* (a) Where smooth bore type hose nozzles are used, the nozzle orifice size shall be as indicated in § 34.10–5 (b).

(b) Fire hose lines in boiler and machinery spaces of vessels of 1,000 gross tons or over shall be provided with at least 2 suitable nozzles of an approved type which are capable of effectively extinguishing oil fires. Approved combination nozzles as described in § 34.10–35 (b), together with the applicator and low velocity fog spray head, will be acceptable for this purpose. The self-cleaning strainer may be fitted, but will not be required.

SUBPART 34.15—CARGO SPACES ON TANK SHIPS

§ 34.15–1 *General requirements for cargo spaces on tank ships constructed or converted on or after November 19, 1952—T/ALL.* (a) Every tank ship shall be provided with an approved fixed fire extinguishing system for all cargo spaces.

(b) The types of fire extinguishing systems which may be used are as follows:

(1) Steam.

(2) Carbon dioxide or other inert gas.

(3) Foam. (May not be used for dry cargo spaces.)

(4) Carbon tetrachloride. (May be used on the approval of the Commandant only. May not be used for tanks in excess of 6,300 cubic feet, not for any dry cargo spaces.)

§ 34.15–5 *General requirements for cargo spaces on tank ships constructed or converted prior to November 19, 1952—T/ALL.* (a) Every tank ship shall be provided with an approved fire extinguishing system for all cargo spaces. Such system may be portable, semiportable or fixed.

(b) The types of fire extinguishing systems which may be used are as follows:

(1) Steam.

(2) Carbon dioxide or other inert gas.

(3) Foam.

(4) Carbon tetrachloride. (May be used on the approval of the Commandant only. May not be used for tanks in excess of 6,300 cubic feet.)

§ 34.15–10 *General requirements for fire extinguishing systems—T/ALL.* (a) For the purposes of this subpart, the term "largest cargo compartment" shall be considered as the cargo space, either liquid or dry, having the greatest volumetric measurement. In the case of liquid cargo tanks, the gross volume of the individual tanks shall be used. In the case of dry cargo compartments, the gross volume shall be taken between adjacent watertight or fire screen bulkheads, and from tank top or lowest deck to the deckhead of the uppermost deck on which cargo may be carried, and if a trunk extends beyond such deckhead, the volume of the trunk shall be included.

(b) The valves of all fixed fire extinguishing systems shall be so located as to be easily accessible and not readily cut off from use by an outbreak of fire, and shall be marked as required by § 35.40–10.

(c) Provisions shall be made for draining the manifolds and individual lines of fire extinguishing systems to protect them against freezing.

(d) In general, all piping shall comply with the requirements of Subchapter F (Marine Engineering) of this chapter. The piping systems for carbon dioxide shall have a minimum bursting pressure of 6,000 p. s. i.

(e) Piping for dry cargo spaces shall be run independent of the extinguishing system for the bulk cargo tanks. If this should be impracticable, valves shall be installed between the main bulk tank extinguishing system and other compartments served, such valves to be marked: "This valve to be kept closed except in case of fire."

(f) For dry cargo spaces, means shall be provided for stopping any ventilator fans and closing all openings from outside the spaces protected.

§ 34.15–15 *Steam systems for cargo spaces—T/ALL.* (a) When a steam fire extinguishing system is installed, the requirements of this section shall be met.

(b) Steam for fire extinguishing systems shall be available from the main boilers, donkey or auxiliary boilers, or from a shore source. The capacity of the steam supply shall be at least equal to one pound of steam per hour for each 12 cubic feet of the largest cargo compartment in the case of tank ships constructed or converted on or after November 19, 1952, and one pound of steam per hour for each 50 cubic feet of the largest cargo compartment in the case of tank ships constructed or converted prior to November 19, 1952.

(c) A steam pressure of at least 100 pounds per square inch shall be maintained for fire extinguishing purposes. Where the maximum allowable boiler working pressure will not permit of this, or where steam from a shore plant is being used, the maximum steam pressure available from either source shall be used, but not to exceed the normal operating pressure of the ship's steam system.

(d) The master valve control shall be located above the uppermost complete deck having permanent means of closing all openings in the weather portions of the deck. The main lines shall have sufficient area to supply all individual lines to the largest tank and the tanks adjacent thereto, and in the case of dry cargo compartments, the entire compartment. The valves to the tanks shall be left open at all times so that, in case of fire, it will be necessary only to open the master valve to insure a flow of steam into each tank, after which, the valves to the tanks which are not on fire may be closed: *Provided*, That where the opening of such branch lines may cause contamination of cargo or cause the passage of gases or vapors between tanks or compartments, they may be kept closed.

(e) Steam smothering lines shall be tested with at least 50 pounds per square inch of air pressure or by blowing steam through the lines at the working pressure and a survey made for detecting corrosion and defects using hammer test or such other means as may be necessary.

(f) The minimum nominal diameter of any steam fire extinguishing pipe shall be 1½ inches.

§ 34.15–20 *Carbon dioxide or other inert gas system for cargo spaces—T/ALL.* (a) When a carbon dioxide system is installed it shall be of an approved type and shall meet the requirements of this section. Specific approval by the Commandant is required for the installation of other inert gas system, and it shall be demonstrated that such system offers protection at least equivalent to the required carbon dioxide system.

(b) At least one pound of carbon dioxide shall be available for each 30 cubic feet of the largest cargo compartment.

(c) For liquid cargo spaces, the rate of discharge shall be such as to supply the required amount within 5 minutes.

(d) For dry cargo spaces, no specific rate of discharge need be provided. However, the pipes to the individual spaces shall be at least ¾ inch.

(e) At annual inspections, all carbon dioxide cylinders for fixed, semiportable, and portable systems shall be examined externally and replaced if any corrosion is found. They shall also be checked by weighing to determine their contents, and if found to be more than 10 percent under the required contents of carbon dioxide, they shall be recharged.

§ 34.15–25 *Foam systems for cargo spaces—T/ALL.*—(a) Approved type. When a foam system is installed, it shall be of an approved type and shall meet the requirements of this section.

(b) *Area protected.* The system shall be so designed and arranged as to spread a blanket of foam over the entire liquid surface of any tank within the range of usual trim. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(c) *Rate of application.* (1) The rate of discharge to foam outlets to the various tanks shall be at least as set forth in this paragraph.

(2) For chemical foam systems with stored "A" and "B" solutions, a total of at least one gallon per minute of the 2 solutions shall be discharged for each 10 square feet of the area protected.

(3) For other types of foam systems, the water rate to the dry powder generators or air foam production equipment shall be at least one gallon per minute for each 10 square feet of the area protected.

(d) *Supply of foam producing material.* There shall be provided a quantity of foam producing materials sufficient to operate the equipment at the discharge rate specified in § 34.15–25 (c) in the tank having the largest superficial liquid area for a period of at least 5 minutes.

(e) *Fixed type.* If the foam system is of the fixed type, the apparatus and chemicals shall be contained in a fire-resistant compartment protected from the weather and where the operator will be shielded from fire and smoke.

(f) *Portable or semiportable type.* If the foam system is of the portable or semiportable type, the apparatus and chemicals shall be stowed in a readily accessible place protected from the weather.

§ 34.15–30 *Carbon tetrachloride systems for cargo spaces—T/ALL.* (a) When a carbon tetrachloride system is installed, at least one quart shall be available for each 225 cubic feet of the largest cargo compartment.

§ 34.15–35 *Flue gas fire extinguishing systems for cargo spaces—T/ALL.* Inert-gas system for extinguishing fires in cargo spaces, where the source of the inert gas is the stack or a furnace for producing such inert gas shall be considered as complying with the regulations in this subchapter, provided such system shall have the approval of the Commandant as required in § 34.15–20 (a).

SUBPART 34.20—BOILER ROOM AND MACHINERY SPACES ON TANK SHIPS

§ 34.20–1 *Fixed fire extinguishing systems for boiler rooms and machinery spaces—T/ALL.* (a) Any fixed fire extinguishing system installed in boiler rooms or machinery spaces, whether required or not, shall be of an approved type.

(b) All tank ships propelled by internal combustion engines using a fuel having a flash point of less than 110 degrees F. shall be fitted with a fixed carbon dioxide fire extinguishing system in the engine room space.

(c) All steam propelled tank ships using oil for fuel, construction or conversion of which is started on or after November 19, 1952, shall be fitted with a fixed carbon dioxide or foam fire extinguishing system in all spaces containing oil fired boilers, whether main or auxiliary, or their fuel oil units, valves, or manifolds in the line between the settling tanks and the boilers.

(d) All tank ships propelled by internal combustion machinery and having auxiliary boilers using oil for fuel, construction or conversion of which is started on or after November 19, 1952, shall be fitted with a fixed carbon dioxide or foam fire extinguishing system in all spaces containing such boilers or their fuel oil units, valves, or manifolds

in the line between the settling tanks and the boilers.

(e) If a fixed fire extinguishing system is installed to protect an internal combustion propelling machinery installation, the system shall be of the carbon dioxide type.

§ 34.20–5 *General requirements for fixed fire extinguishing systems—T/ALL.* (a) The valves of all fire extinguishing systems shall be plainly marked to indicate the compartments into which they discharge, and they shall be so located as to be easily accessible and not readily cut off from use by an outbreak of fire.

(b) Provisions shall be made for draining the manifolds and individual lines.

(c) Where the same type medium is used for both the machinery space and cargo extinguishing systems, the same supply may be used.

(d) If fuel can drain from the compartment being protected to an adjacent compartment, or if the compartments are not entirely separate, the requirements for both compartments shall be used to determine the amount of extinguishing agent to be provided. The extinguishing agent shall be arranged to discharge into both such compartments simultaneously.

§ 34.20–10 *Fixed carbon dioxide fire extinguishing systems installed on tank ships on or after November 19, 1952—T/ALL.* (a) The quantity of carbon dioxide in pounds to be supplied shall be at least equal to the gross volume of the space in cubic feet, taken between watertight or oiltight bulkheads and from tank top or flat forming the lower boundary of the space to the deck head of the space, divided by a factor as set forth in Table 34.20–10 (a) depending upon the volume of the space. For machinery spaces, the upper boundary of the space shall be taken as the underside of the deck forming the hatch opening unless the machinery or boilers extend into such hatch, in which case, the volume shall be taken to the top of the hatch trunk or the next material reduction in area of the trunk, whichever is lower.

TABLE 34.20–10 (a)

Gross volume of space, cubic feet		Factor
Over	Not over	
------	500	15
500	1,600	16
1,600	4,500	18
4,500	50,000	20
50,000	------	22

(b) The whole charge of carbon dioxide shall be capable of being released simultaneously by operating one valve and one control; such valve and control shall be adequately protected to avoid the accidental discharge of the system. The valves shall be marked as required by § 35.40–10.

(c) The system shall be so designed that the cylinders are completely discharged in not more than 2 minutes.

(d) The arrangement of piping shall be such as to give a general and fairly uniform distribution over the entire space protected. All pipes, valves, and fittings shall have a minimum bursting pressure of 6,000 p. s. i.

(e) A suitable alarm shall be provided to operate automatically when the control valve is operated. The alarm shall be conspicuously and centrally located in the space protected and shall be marked as required by § 35.40–7.

(f) Means shall be provided for stopping all mechanical ventilation to the space protected from outside such space.

(g) Means shall be provided for closing all openings to the space protected from outside such space. In this respect, dampers or other means shall be available for blanking-off natural ventilators, and relatively tight doors and shutters shall be provided for openings in the lower portion of the space. The construction shall be such that openings in the upper portion of the space can be closed-off either by permanently installed means or by the use of canvas or other materials which is normally carried by the tank ship.

§ 34.20–15 *Fixed carbon dioxide fire extinguishing systems installed on tank ships prior to November 19, 1952—T/ALL.* (a) (1) A total flooding system is one in which the entire space is protected. The quantity of carbon dioxide in pounds to be supplied shall be at least equal to the gross volume of the space in cubic feet, taken between oiltight or watertight bulkheads and from tank top or flat forming the lower boundary of the space to the deck head of the space, divided by 22. For machinery spaces, the upper boundary of the space shall be taken as the underside of the deck forming the hatch opening unless the machinery or boilers extend into such hatch, in which case, the volume shall be taken to the top of the machinery or boilers.

(2) A bilge system is one in which the bilge or space below the floor plates is protected. The quantity of carbon dioxide in pounds to be supplied shall be at least equal to the gross volume of the space in cubic feet, taken between watertight or oiltight bulkheads and from the tank top or flat forming the lower boundary of the space to the top of the shell of a fire tube boiler or top of the casing or drums of a water tube boiler, divided by 36.

(b) When a fixed carbon dioxide extinguishing system is installed to protect a space containing oil fired boilers, either a bilge system or a total flooding system may be used.

(c) When a fixed carbon dioxide fire extinguishing system is installed to protect a space containing internal combustion propelling machinery, a total flooding system shall be used.

(d) The provisions of § 34.20–10 (b) through (e) shall be complied with and § 34.20–10 (f) and (g) shall be complied with insofar as is reasonable and practicable.

§ 34.20–20 *Fixed foam fire extinguishing systems—T/ALL.* (a) (1) The system shall be so designed and arranged as to spread a blanket of foam over the entire tank top or bilge of the space protected. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(2) Where such installations are made on or after November 19, 1952, to protect an oil fired boiler installation on a flat which is open to or can drain to the lower engine room or other space, both the flat and the lower space shall be protected simultaneously. The flat shall be fitted with suitable coamings on all openings other than the deck drains to properly restrain the foam at that level. Other installations of a similar nature shall be considered in a like manner.

(b) (1) The rate of discharge to foam outlets protecting the hazard or area shall be at least as set forth in this paragraph.

(2) For chemical foam systems with stored "A" and "B" solutions, a total of at least 1.6 gallons per minute of the two solutions shall be discharged for each 10 square feet of area protected.

(3) For other types of foam systems, the water rate to the dry powder generators or air foam production equipment shall be at least 1.6 gallons per minute for each 10 square feet of surface to be protected.

(c) There shall be provided a quantity of foam producing materials sufficient to operate the equipment at the discharge rate specified in § 34.20–20 (b) for a period of at least 3 minutes.

(d) All containers and valves by which the foam system is operated shall be easily accessible and so placed that they will not readily be cut off from use by an outbreak of fire. The valves shall be marked as required by § 35.40–10.

(e) Where installations are made on or after November 19, 1952, in order that any residual fires above the floor plates may be extinguished when a foam system is used, at least 2 fire hydrants, in addition to those required for the machinery space by § 34.10–35 (b), shall be installed outside of the machinery space entrances. Such hydrants shall be fitted with sufficient hose so that any part of the machinery space may be reached with at least 2 streams of water, and each hose shall be equipped with an approved combination nozzle, applicator, and self-cleaning strainer as described in § 34.10–35 (b).

(f) On installations installed prior to November 19, 1952, a semiportable foam generator using a dry chemical mixture or mechanical foam in conjunction with the fire lines may be substituted for the fixed system subject to the following conditions:

(1) There shall be at least one fire pump of suitable capacity available which can be operated and controlled from outside the space protected.

(2) Stop valves shall be installed in the line so that if any portion of the fire main is ruptured, the foam generator may still be operated. Connections for at least 2 fire hoses shall be provided between the pump and the stop valve.

(g) All piping shall comply with the requirements of Subchapter F (Marine Engineering) of this chapter.

§ 34.20–25 *Fire extinguishing equipment, other than fixed, for boiler and machinery spaces on tank ships—T/ALL.* (a) The minimum requirements for fire

fighting equipment on all tank ships which are not fitted with fixed fire extinguishing systems in boiler room and machinery spaces shall be of the type and character specified as follows:

(1) Steam tank ships of more than 750 gross tons: One semiportable fire extinguisher of either the 40-gallon capacity foam type, 100-pound capacity carbon dioxide type, or dry chemical type having approved equivalent capacity, for each boiler room.

(2) Steam tank ships of 750 gross tons and under: One semiportable fire extinguisher of either the 20-gallon capacity foam type, 50-pound capacity carbon dioxide type, or dry chemical type having approved equivalent capacity, for each boiler room.

(3) Internal combustion engine driven tank ships of 50 gross tons and upward: One semiportable fire extinguisher of either the 12-gallon capacity foam type, 35-pound capacity carbon dioxide type, or dry chemical type having an approved equivalent capacity, for each 1,000 b. hp. or fraction thereof. Alternately, approved units having a larger capacity may be used, provided the total capacity is not less than that required for the individual units.

(4) When donkey boilers using oil as fuel are located in the machinery spaces on tank ships propelled by internal combustion engines, a 40-gallon capacity semiportable fire extinguisher of the foam type, or its equivalent as set forth in subparagraph (1) of this paragraph, shall be substituted for one of the 12-gallon capacity semiportable fire extinguishers, or equivalent, required by subparagraph (3) of this paragraph.

(5) All of the foregoing semiportable fire extinguishers shall be fitted with suitable hose attachments or other approved methods of distributing the foam, carbon dioxide, or dry chemical in any part of the space to be protected.

(b) On tank ships of 1,000 gross tons and over in ocean or coastwise service, the construction or conversion of which was started on or after November 19, 1952, there shall be installed in any space containing an oil fired boiler, either main or auxiliary, one 2½-gallon foam type fire extinguisher, or the equivalent as described in § 34.25–25, for each burner. However, the total number need not exceed 5 in any one space. These fire extinguishers are in addition to those required by §§ 34.25–25 and 34.25–30.

(c) On tank ships of 1,000 gross tons and over in ocean or coastwise service, propelled by internal combustion engines, the construction or conversion of which was started on or after November 19, 1952, there shall be installed one 2½-gallon foam type fire extinguisher, or the equivalent as described in § 34.25–25, for each 1,000 b. hp. of the main engines or fraction thereof; provided there shall be at least 2 such fire extinguishers, but need not be more than 6. These fire extinguishers are in addition to those required by § 34.25–25.

(d) On tank ships of 1,000 gross tons and over in ocean or coastwise service, propelled by internal combustion engines, the construction or conversion of which was started on or after November 19, 1952, if a fixed fire extinguishing system is fitted in the machinery space, there shall be in addition to each space containing such engines a 12-gallon capacity semiportable fire extinguisher of the foam type, or its equivalent as set forth in paragraph (a) (3) of this section, fitted in accordance with the provisions of paragraph (a) (5) of this section.

SUBPART 34.21—PUMP ROOMS ON TANK SHIPS

§ 34.21–1 *Fixed fire extinguishing systems for tank ships constructed or converted on or after November 19, 1952—T/ALL.* (a) On tank ships the construction or conversion of which was started on or after November 19, 1952, a fixed steam, foam, or carbon dioxide fire extinguishing system shall be provided for the pump rooms.

(b) Piping for the pump room system shall be run independent of the fire extinguishing system for the bulk cargo tanks. If this should be impracticable, valves shall be installed between the main bulk tank extinguishing systems and the pump room, such valves to be marked: "This valve to be kept closed except in case of fire."

(c) Control valves for pump room extinguishing systems shall be located adjacent to the pump room exit. The valves shall be marked as required by § 35.40–10.

(d) Means shall be provided for stopping ventilation fans from outside the space, and for closing all doorways, hatches, and other openings, when steam or inert gas is used.

(e) When a steam smothering system is installed, the outlets shall terminate in the lower pump room, just above the floor plates. The steam smothering system shall meet the general requirements of § 34.15–15.

(f) When a carbon dioxide system is installed, it shall meet the general requirements contained in § 34.20–10.

(g) When a foam system is installed, it shall meet the general requirements of § 34.20–20.

§ 34.21–5 *Fire extinguishing systems for tank ships constructed or converted prior to November 19, 1952—T/ALL.* (a) On tank ships the construction or conversion of which was started prior to November 19, 1952, but on or after July 1, 1951, a steam, inert gas, or foam system shall be provided for extinguishing fires in pump rooms. For vessels the construction or conversion of which was started prior to July 1, 1951, such systems are not required, but if installed, should meet the general requirements of this section.

(b) Piping for fixed pump room systems, shall be run independent of the fire extinguishing system for the bulk cargo tanks. If this should be impracticable, valves shall be installed between the main bulk tank extinguishing system and the pump room, such valves to be marked: "This valve to be kept closed except in case of fire."

(c) Control valves for fixed pump room extinguishing systems shall be located adjacent to the pump room exit. The valves shall be marked as required by § 35.40–10.

(d) Means shall be provided for stopping ventilation fans from outside the space, and for closing all doorways, hatches, and other openings, when steam or inert gas is used.

(e) When a steam smothering system is installed, the outlets shall terminate in the lower pump room, just above the floor plates.

SUBPART 34.22—LAMP AND PAINT ROOMS AND SIMILAR COMPARTMENTS ON TANK SHIPS

§ 34.22–1 *Fireproofing of lamp, oil, and paint rooms—T/ALL.* Lamp, oil and paint rooms shall be wholly and tightly lined with metal.

§ 34.22–5 *Fixed fire extinguishing systems for lamp and paint rooms and similar spaces on tank ships constructed or converted on or after November 19, 1952—T/ALL.* (a) On tank ships the construction or conversion of which was started on or after November 19, 1952, a fixed carbon dioxide or steam fire extinguishing system shall be installed in all paint rooms and similar compartments.

(b) Piping for the lamp and paint lockers and similar compartments shall be run independent of the extinguishing system for the bulk cargo tanks. If this should be impracticable, valves shall be installed between the main bulk tank extinguishing system and other compartments, such valves to be marked: "This valve to be kept closed except in case of fire."

(c) Control valves shall be marked as required by § 35.40–10.

(d) When a steam system is installed, it shall meet the general requirements of § 34.15–15.

(e) When a carbon dioxide system is installed, it shall meet the general requirements contained in § 34.20–10.

(f) Means shall be provided for stopping ventilation fans from outside the space, and for closing all doors and other openings.

§ 34.22–10 *Fire extinguishing systems for lamp and paint rooms and similar spaces on tank ships constructed or converted prior to November 19, 1952—T/ALL.* (a) On tank ships the construction or conversion of which was started prior to November 19, 1952, a steam, inert gas, or foam system shall be provided for extinguishing fires in all lamp and paint rooms and similar compartments.

(b) Piping for the lamp and paint lockers and similar compartments shall be run independent of the extinguishing system for the bulk cargo tanks. If this should be impracticable, valves shall be installed between the main bulk tank extinguishing system and other compartments, such valves to be marked: "This valve to be kept closed except in case of fire."

(c) Control valves for fixed systems shall be marked as required by § 35.40–10.

(d) Means shall be provided for stopping ventilation fans from outside the space, and for closing all doors and other openings when steam or inert gas is used.

SUBPART 34.25—HAND FIRE EXTINGUISHERS

§ 34.25–1 *Hand fire extinguishers; test and approval—TB/ALL.* Every type

of fire extinguisher provided for and required by this part shall be tested by the National Bureau of Standards, Department of Commerce, and a report made by that bureau to the Commandant, who shall then determine whether the said extinguisher shall be approved for use on vessels subject to inspection.

§ 34.25–5 *Hand fire extinguishers; marking—TB/ALL.* Every fire extinguisher approved after May 31, 1921, for use on vessels under the jurisdiction of the Coast Guard shall have affixed thereto a metallic name plate having plainly stamped thereon the name of the fire extinguisher, the rated capacity in gallons, quarts, or pounds, and the name and address of the person or firm for whom approved.

§ 34.25–10 *Hand fire extinguishers; location TB/ALL.* (a) Hand fire extinguishers shall be located in such parts of the tank vessel as in the opinion of the Officer in Charge, Marine Inspection, will be most convenient and serviceable in case of emergency and so arranged that they may be easily removed from their fastenings.

(b) One of the hand fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

(c) Hand fire extinguishers in which the medium is stored under pressure shall not be kept in passenger or crew accommodations.

§ 34.25–15 *Hand fire extinguishers; inspection—TB/ALL.* Every fire extinguisher shall be discharged and examined at each annual inspection: *Provided,* That carbon tetrachloride fire extinguishers shall be tested for their pumping efficiency and the liquid discharged with proper care so that it may be replaced in the extinguishers. Carbon dioxide fire extinguishers shall be checked by weighing to determine contents, and, if found to be more than 10 percent under required contents of carbon dioxide, they shall be recharged.

§ 34.25–20 *Hand fire extinguishers; spare charges and parts—TB/ALL.* (a) Extra charges shall be carried on board for 50 percent of each class of fire extinguishers required. If 50 percent of each class of fire extinguishers carried gives a fractional result, extra charges and extra safety valve units shall be provided for the next largest whole number: *Provided,* That extra charges for carbon dioxide type fire extinguishers shall be considered either an additional carbon dioxide extinguisher or a 2½-gallon foam extinguisher, and for this 2½-gallon foam extinguisher no extra charge will be required.

(b) Recharges, particularly the acid used in charging soda-and-acid type of fire extinguisher, shall be packed in such manner that the filling operation (i. e., in recharging the extinguisher) can be performed without subjecting the person doing the recharging to undue risk of acid burns and shall be contained in Crown stopper type of bottle.

(c) Extra safety valve units shall be carried on board for 50 percent of all hand fire extinguishers of the foam type.

§ 34.25–25 *Hand fire extinguishers; number required on tank ships—T/ALL.* (a) Tank ships shall be provided with chemical fire extinguishers as follows:

Size of tank ship, gross tons:	*Minimum number of fire extinguishers*
Not over 100	2
Over 100 and not over 500	3
Over 500 and not over 1,000	6
Over 1,000	8

(b) The number of fire extinguishers required by paragraph (a) of this section is based on the ordinary 2½-gallon foam type fire extinguisher and other types of fire extinguishers may be substituted according to the following schedule: One 2½-gallon foam type fire extinguisher is equivalent to one 15-pound carbon dioxide type, or two 1-quart carbon tetrachloride type, or one 12-pound dry chemical type. A 2½-gallon soda-acid type fire extinguisher, or its equivalent in other approved water types, may be substituted for the required foam type fire extinguisher within the accommodation spaces and similar spaces where neither oil nor electrical fires are the primary anticipated hazard.

(c) No fire extinguisher of a capacity greater than 2½ gallons (or equivalent sizes of other types) shall be allowed a greater rating than the ordinary 2½-gallon size, but fire extinguishers of less capacity are allowable under paragraphs (a) and (b) of this section when their total contents equal the required quantity on tank ships.

§ 34.25–30 *Hand fire extinguishers required on tank vessels of over 15 gross tons using oil as fuel—TB/ALL.* (a) In boiler rooms, and machinery spaces which contain internal-combustion engines, there shall be provided at least two 2½-gallon foam type fire extinguishers or their equivalents as provided in § 34.25–25. On tank ships these fire extinguishers shall be in addition to those provided in § 34.25–25.

(b) Where gasoline is carried in a separate storage tank for use in an auxiliary lighting or wireless unit or work boats, at least two 2½-gallon foam type extinguishers or their equivalents, as required in § 34.25–25, shall be provided, and such fire extinguishers shall be located within a reasonable distance of the gasoline storage tank.

SUBPART 34.30—FIRE AXES

§ 34.30–1 *Fire axes required—T/ALL.* All tank ships shall be provided with fire axes as follows:

Size of tank ship, gross tons:	*Minimum number of fire axes*
Not over 50	1
Over 50 and not over 200	2
Over 200 and not over 500	3
Over 500 and not over 1,000	4
Over 1,000	5

§ 34.30–5 *Location and use of fire axes—T/ALL.* All fire axes shall be located so as to be readily found in time of need, shall not be used for general purposes, and shall be kept in good condition.

SUBPART 34.35—SAND BOXES

§ 34.35–1 *Sand boxes required on tank vessels using oil as fuel under boilers—TB/ALL.* (a) Tank vessels of 500 gross tons and under, using oil as fuel under boilers, shall be fitted with metal tanks in the space where such oil is used, containing 5 cubic feet of sand and a scoop or shaker for distributing the same, and such tank, sand, and scoop, when so provided may be considered as replacing one of the fire extinguishers required under § 34.25–30 (a).

(b) Tank vessels of over 500 gross tons, using oil as fuel, under boilers, shall be fitted with metal tanks in the space where such oil is used, containing 10 cubic feet of sand and a scoop or shaker.

SUBPART 34.40—FIRE-FIGHTING EQUIPMENT FOR TANK BARGES

§ 34.40–1 *Portable extinguishing equipment for cargo spaces—B/ALL.* (a) All tank barges of 100 gross tons and over, whose certificate requires that they be manned, and which are not equipped with a steam fire-extinguishing system as required on a tank ship, shall be equipped with approved chemical, inert gas, or foam in the following quantities:

33 gallons of foam; or,
200 pounds of carbon dioxide; or,
7 gallons of carbon tetrachloride.

This is in addition to the hand extinguishers required in § 34.40–5.

(b) The above equipment may be either portable or equipped with sufficient lengths of hose or piping to deliver the extinguishing agent to any point on deck or in the crew's accommodation. If portable extinguishers are used, each unit must weigh less than 55 pounds. Extinguishers shall be located in protected and accessible places but not immediately adjacent to cargo tank hatches and openings.

§ 34.40–5 *Hand fire extinguishers for quarters, pump room, and machinery spaces—B/ALL.* (a) Each tank barge whose certificate requires that it be manned and each unmanned tank barge with pump room shall be provided with approved hand extinguishers located in or adjacent to the entrance of spaces, as follows:

(1) Living accommodations.
(2) Galley.
(3) Pump room.
(4) Pump engine room.
(5) Fireroom.

(b) The fire extinguishers at each location shall be not less than one of the equivalent amounts as follows:

(1) 2½ gallons of foam; or,
(2) 15 pounds of carbon dioxide; or,
(3) 2 quarts of carbon tetrachloride; or,
(4) 12 pounds dry chemical.

(c) In no event shall a manned tank barge or an unmanned tank barge with a pump room be provided with less than one of the equivalent quantities, as follows:

(1) 5 gallons of foam; or,
(2) 30 pounds of carbon dioxide; or,
(3) 4 quarts of carbon tetrachloride.

(d) Each unmanned tank barge not provided with a cargo pump room shall

be equipped with at least one 2½-gallon foam-type fire extinguisher or the equivalent, which may be carried aboard the barge or the towing vessel while under way. When the barge is moored to the dock, such equipment shall be accessible, or equivalent equipment may be supplied by the terminal.

PART 35—OPERATIONS

SUBPART 35.15—CASUALTY OR ACCIDENT REPORTS

Section 35.15–1 (a) (5) is amended to read as follows:

§ 35.15–1 *Notice of casualty and voyage records—TB/ALL.* (a) * * *

(5) Injury causing any person to remain incapacitated for a period in excess of 72 hours; except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

(R. S. 4405, as amended, 4462, as amended, sec. 5, 55 Stat. 244, as amended; 46 U. S. C. 375, 416; 50 U. S. C., App. 1275. Interpret or apply R. S. 4450, as amended, secs. 1, 2, 49 Stat. 1544; 46 U. S. C. 239, 367)

SUBPART 35.30—GENERAL

Section 35.30–20 is amended to read as follows:

§ 35.30–20 *Fresh air breathing apparatus—TB/ALL.* (a) All manned tank vessels having tanks which exceed 15 feet in depth, measured from the deck to the lowest point at which cargo is carried, and all tank ships of 1,000 gross tons and over shall be provided with an outfit as follows:

(1) One approved fresh air breathing apparatus, including belt and life line. The length of the air hose shall be sufficient to reach from the open deck, well clear of hatch or doorway, to any part of the holds, tanks, or machinery spaces.

(2) One approved 3-cell, explosion-proof flashlight, constructed in accordance with Subpart 161.008 of Subchapter Q (Specifications) of this chapter.

(3) One fire axe.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 35.35—CARGO HANDLING

Section 35.35–1 is amended to read as follows:

§ 35.35–1 *Men on duty—TB/ALL.* A sufficient number of the crew shall be on duty to perform transfer operations. In the case of unmanned barges, a person holding a valid license as master, mate, pilot, or engineer, or a certificated tankerman may be supplied by a terminal.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 35.40—MARKING OF FIRE AND EMERGENCY EQUIPMENT

Part 35 is amended by adding a new § 35.40–7 reading as follows:

§ 35.40–7 Carbon dioxide alarm—*T/ALL.* Adjacent to all carbon dioxide fire extinguishing alarms installed after November 19, 1952, there shall be conspicuously marked: "WHEN ALARM SOUNDS VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED."

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

PART 38—LIQUEFIED PETROLEUM GASES

SUBPART 38.10—PIPING, VALVES, FITTINGS, AND ACCESSORY EQUIPMENT

Section 38.10–15 is amended to read as follows:

§ 38.10–15 *Safety relief valves—TB/ALL.* (a) Each tank shall be fitted with one or more approved safety relief valves designed, constructed and flow-tested for capacity in conformance with Subpart 162.018 of Subchapter Q (Specifications) of this chapter.

(b) Each safety relief valve shall be set to start to discharge at a pressure not in excess of the design pressure of the tank.

(c) The safety relief valves shall have a relieving capacity sufficient to prevent a rise of pressure in the tank of more than 20 percent above the maximum design pressure when all the safety relief valves are blowing. The minimum required rates of discharge of safety relief valves shall not be less than that shown in Table 38.10–15 (c).

TABLE 38.10–15 (c)—MINIMUM REQUIRED RELIEVING CAPACITIES FOR SAFETY RELIEF VALVES

[Discharge measured in cubic feet per minute of liquefied petroleum gas at 60° F. and atmospheric pressure (14.7 p. s. i. absolute)]

Tank size D x U [1]	Minumum tank design pressure, p. s. i.[2]			
	100	150	200	250 [3]
40	2,725	2,840	3,050	3,250
41	2,795	2,910	3,120	3,330
42	2,860	2,980	3,200	3,410
43	2,930	3,050	3,270	3,490
44	3,000	3,120	3,350	3,570
45	3,070	3,190	3,420	3,650
46	3,140	3,260	3,500	3,730
47	3,205	3,340	3,570	3,810
48	3,275	3,400	3,650	3,890
49	3,340	3,470	3,720	3,970
50	3,410	3,550	3,800	4,050
51	3,475	3,620	3,880	4,120
52	3,545	3,680	3,960	4,200
53	3,615	3,760	4,030	4,270
54	3,680	3,830	4,100	4,360
55	3,750	3,900	4,170	4,430
56	3,820	3,970	4,250	4,510
57	3,890	4,040	4,320	4,590
58	3,955	4,110	4,400	4,670
59	4,020	4,180	4,470	4,750
60	4,090	4,250	4,540	4,790
65	4,430	4,610	4,920	5,220
70	4,770	4,960	5,290	5,610
75	5,110	5,300	5,650	6,000
80	5,450	5,650	6,020	6,390
85	5,790	6,000	6,490	6,780
90	6,130	6,350	6,700	7,180
95	6,470	6,700	7,120	7,570
100	6,800	7,050	7,490	7,960
105	7,150	7,400	7,760	8,360
110	7,500	7,750	8,240	8,740
115	7,850	8,120	8,610	9,120
120	8,200	8,470	8,980	9,500
140	9,550	9,860	10,450	11,020
160	10,900	11,260	11,920	12,500
180	12,270	12,660	13,400	13,900
200	12,510	13,200	13,980	14,480
220	13,440	13,740	14,520	15,080
240	13,880	14,260	15,100	15,650
260	14,420	14,800	15,690	16,230
280	14,960	15,400	16,220	16,820

[1] D=outside diameter of tank in feet and fractions thereof. U=over-all length of tank in feet and fractions thereof.

[2] For tank design pressures exceeding the minimum values shown in respective columns, use next higher figure.

[3] On tanks with design pressures exceeding 250 p. s. i. the safety relief value minimum requirements for 250 p. s. i. design pressure may be used.

TABLE 38.10–15 (c)—MINIMUM REQUIRED RELIEVING CAPACITIES FOR SAFETY RELIEF VALVES—Continued

Tank size D x U [1]	Minumum tank design pressure, p. s. i.[2]			
	100	150	200	250 [3]
300	15,490	15,930	16,800	17,400
320	16,020	16,470	17,460	17,990
340	16,540	17,000	17,920	18,560
360	17,080	17,550	18,490	19,150
380	17,610	18,100	19,040	19,730
400	18,140	18,640	19,600	20,300
420	18,690	19,200	20,180	20,900
440	19,210	19,760	20,740	21,470
460	19,740	20,300	21,300	22,040
480	20,290	20,840	21,860	22,620
500	20,820	21,390	22,400	23,210
520	21,350	21,930	22,960	23,790
540	21,880	22,480	23,500	24,380
560	22,400	23,030	24,130	24,960
580	22,940	23,580	24,690	25,540
600	23,470	24,120	25,280	26,120
620 [4]	24,000	24,650	25,800	26,700
	Air conversion factors [5]			
	1.180	1.142	1.078	1.010

[4] For D x U over 620, discharge capacity shall be calculated in direct proportion to preceding values.

[5] To obtain equivalent rates of discharge for air, multiply the discharge rates for liquefied gas petroleum by the factors indicated under each column.

(d) Safety relief valves shall be attached to the tank near the highest point of the vapor space. Shutoff valves shall not be installed between the tanks and safety relief valves, except manifolds for mounting multiple safety relief valves may be fitted with acceptable interlocking shutoff valves so arranged at all times as to permit the required capacity discharge through the open safety relief valves.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

SUBPART 38.20—VENTING AND VENTILATION

1. Section 38.20–1 (a) is amended to read as follows:

§ 38.20–1 *Venting—T/ALL.* (a) Each safety relief valve installed on a cargo tank shall be connected to a branch vent of a venting system which shall be constructed so that the discharge of gas will be directed vertically upward to a point at least 10 feet above the weather deck or the top of any tank or house located above the weather deck.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

2. Section 38.20–5 is amended to read as follows:

§ 38.20–5 *Venting—B/ALL.* (a) Safety relief valves on cargo tanks in barges may be connected to individual or common risers which shall extend to a reasonable height above the deck. An alternate arrangement consisting of a branch vent header system as required by § 38.20–1 may be installed. In any case, the provisions of § 38.20–1 (d) through (h) shall apply.

(b) Arrangement specially provided for venting cargo tanks forming a part of the hull on unmanned barges will be considered by the Commandant upon presentation of plans.

(R. S. 4405, as amended, 4417a, as amended, 4462, as amended; 46 U. S. C. 375, 391a, 416)

Subchapter E—Load Lines

PART 43—FOREIGN OR COASTWISE VOYAGE[1]

Part 43 is amended to read as follows:

SUBPART 43.01—ADMINISTRATION

Sec.
43.01–1 Establishment of regulations.
43.01–5 Responsibility for administration.
43.01–10 Application of regulations.
43.01–15 Timber cargoes.
43.01–20 Tankers.
43.01–25 New and existing vessels.
43.01–30 Vessels of special type.
43.01–35 Marks to indicate load lines.
43.01–40 Assignment and certification; assigning authority.
43.01–45 Certification of existing load lines.
43.01–50 Surveys.
43.01–55 Annual inspection.
43.01–60 Application for assignment, renewal, and certification.
43.01–65 Application for annual inspection.
43.01–70 Equivalents.
43.01–75 Validity and renewal of certificates.
43.01–80 Forms of certificates.
43.01–85 Cancellation of certificate.
43.01–90 Zones and seasonal areas.
43.01–95 Log book entries.
43.01–97 Control.
43.01–100 Approval of Commandant, U. S. Coast Guard.

SUBPART 43.05—GENERAL RULES FOR DETERMINING MAXIMUM LOAD LINES OF MERCHANT VESSELS

43.05–1 Definitions.
43.05–5 Deck line.
43.05–10 Load line disk.
43.05–15 Lines used with disk.
43.05–20 Mark of assigning authority.
43.05–25 Details of marking.
43.05–30 Verification of marks.

SUBPART 43.10—CONDITIONS OF ASSIGNMENT OF LOAD LINES

43.10–1 Construction of vessel.
43.10–5 Cargo and other hatchways not protected by superstructures.
43.10–10 Hatchway coamings.
43.10–15 Hatchway covers.
43.10–20 Hatchway beams and fore-and-afters.
43.10–25 Carriers or sockets.
43.10–30 Cleats.
43.10–35 Battens and wedges.
43.10–40 Tarpaulins.
43.10–45 Security of hatchway covers.
43.10–50 Cargo and other hatchways in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.
43.10–55 Hatchway coamings and closing arrangements.
43.10–60 Machinery space openings in exposed positions on freeboard and raised quarter-decks.
43.10–65 Machinery space openings in exposed positions on superstructure decks other than raised quarter-decks.
43.10–67 Machinery space openings in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.
43.10–70 Flush bunker scuttles.
43.10–75 Companionways.
43.10–77 Ventilators in exposed positions on freeboard and superstructure decks.
43.10–80 Air pipes.
43.10–85 Gangway, cargo, and coaling ports.
43.10–87 Scuppers and sanitary discharge pipes.
43.10–90 Air ports.
43.10–95 Guard rails.
43.10–97 Freeing ports.
43.10–100 Protection of crew.

SUBPART 43.15—LOAD LINES FOR STEAMERS

43.15–1 Length (L).
43.15–5 Breadth (B).
43.15–7 Molded depth.
43.15–10 Depth for freeboard (D).
43.15–15 Coefficient of fineness (c).
43.15–17 Strength.
43.15–20 Height of superstructure.
43.15–25 Standard height of superstructure.
43.15–27 Length of superstructure (S).
43.15–30 Enclosed superstructure.
43.15–35 Superstructure bulkheads.
43.15–37 Class 1 closing appliances.
43.15–40 Class 2 closing appliances.
43.15–43 Temporary closing appliances.
43.15–45 General, relative superstructures.
43.15–47 Poop.
43.15–50 Raised quarter-deck.
43.15–53 Bridge.
43.15–55 Forecastle.
43.15–57 Trunk.
43.15–60 Enclosed superstructure with middle line openings in the deck not provided with permanent means of closing.
43.15–63 Deductions for superstructures.
43.15–65 Sheer, general.
43.15–67 Standard sheer profile.
43.15–70 Measurement of variations from standard sheer profile.
43.15–73 Correction for variations from standard sheer profile.
43.15–75 Addition for deficiency in sheer.
43.15–77 Deduction for excess sheer.
43.15–80 Standard round of beam.
43.15–83 Round of beam correction.
43.15–85 Summer freeboard.
43.15–87 Tropical freeboard.
43.15–90 Winter freeboard.
43.15–93 Winter North Atlantic freeboard.
43.15–95 Fresh-water freeboard.
43.15–97 Freeboard table for steamers.

SUBPART 43.20—LOAD LINES FOR SAILING VESSELS

43.20–1 Lines to be used on sailing vessels in connection with the disk.
43.20–5 Conditions of assignment of sailing vessel load lines.
43.20–10 Computation of freeboard, sailing vessels.
43.20–15 Depth for freeboard, sailing vessels (D).
43.20–20 Coefficient of fineness, sailing vessels (c).
43.20–25 Superstructures in wood sailing vessels.
43.20–30 Deductions for sailing vessel superstructures.
43.20–35 Minimum freeboards for sailing vessels.
43.20–40 Freeboard table for sailing vessels.
43.20–45 Freeboard for wood sailing vessels.

SUBPART 43.25—LOAD LINES FOR STEAMERS CARRYING TIMBER DECK CARGOES

43.25–1 Definitions.
43.25–5 Marks on the vessel's sides; timber cargo; timber load lines.
43.25–10 Construction of vessel; timber cargo.
43.25–15 Superstructures; timber cargo.
43.25–20 Machinery casings; timber cargo.
43.25–25 Double bottom tanks; timber cargo.
43.25–30 Bulwarks; timber cargo.
43.25–35 Deck openings covered by timber deck cargo.
43.25–40 Stowage; timber cargo.
43.25–45 Protection of crew, access to machinery space; timber cargo.
43.25–50 Steering arrangements; timber cargo.
43.25–55 Uprights; timber cargo.
43.25–60 Lashings; timber cargo.
43.25–65 Plans; timber cargo.
43.25–70 Computation of freeboard; timber cargo.

SUBPART 43.30—LOAD LINES FOR TANKERS

43.30–1 Marks on the vessel's sides; tanker.
43.30–5 Construction of tanker.
43.30–10 Forecastle; tanker.
43.30–15 Machinery casings; tanker.
43.30–20 Gangway; tanker.
43.30–25 Protection of crew; access to machinery space; tanker.
43.30–30 Hatchways; tanker.
43.30–35 Ventilators; tanker.
43.30–40 Freeing arrangements; tanker.
43.30–45 Plans; tanker.
43.30–50 Computation of freeboard; tanker.
43.30–55 Deductions for detached superstructures; tankers.
43.30–60 Deduction for excess sheer; tanker.
43.30–65 Winter North Atlantic freeboard; tanker.
43.30–70 Freeboard table for tankers.

SUBPART 43.35—LUMBER SCHOONERS

43.35–1 Load line marks for vessels specially constructed for the carriage of complete cargoes of timber (lumber schooner type).

SUBPART 43.40—ZONES AND SEASONAL AREAS AND MISCELLANEOUS REQUIREMENTS

43.40–1 Boundaries of the zones and seasonal areas.
43.40–5 Fees, travel expense.
43.40–10 Forms of load line certificates.
43.40–15 Titles of load line laws and rules regarded as equivalent to the British Board of Trade Rules, 1906.

AUTHORITY: §§ 43.01–1 to 43.40–15 issued under sec. 2, 45 Stat. 1493, as amended, sec. 2, 49 Stat. 888, as amended; 46 U. S. C. 85a, 88a.

SUBPART 43.01—ADMINISTRATION

§ 43.01–1 *Establishment of regulations.*[1] (a) Load lines are established by the regulations in this part for:

(1) Merchant vessels of 150 gross tons or over when engaged in a foreign voyage by sea (the Great Lakes excepted) in conformity with the act to establish load lines for American vessels, and for other purposes, approved March 2, 1929 (45 Stat. 1492; 46 U. S. C. 85–85g), and effective September 2, 1930, and in conformity with the International Load Line Convention, 1930, ratified by the United States February 27, 1931, effective January 1, 1933; and,

(2) Merchant vessels of 150 gross tons or over when engaged in a coastwise voyage by sea from one port or place in the United States or its possessions to another port or place in the United States or its possessions, or conversely, and passes outside the line dividing inland waters from the high seas as established in accordance with section 2 of the act of February 19, 1895, as amended (28 Stat. 672; 33 U. S. C. 151), in conformity with the Coastwise Load Line Act of 1935, amended June 20, 1936 (49 Stat. 888, 1543; 46 U. S. C., 88–88i), effective for vessels of 4,000 gross tons and over November 27, 1935, and for other vessels August 27, 1936.

[1] See Part 44 for load line regulations applicable to coastwise load lines for steam colliers, tugs, barges, and self-propelled barges in special services and for Great Lakes vessels making foreign and coastwise voyages.

[1] See Parts 44 and 45 of this subchapter for regulations relating to steam colliers, tugs, barges, self-propelled barges, and Great Lakes vessels.

(b) This part shall not apply to merchant vessels on foreign voyages that are being towed and which are carrying neither cargo nor passengers.

§ 43.01–5 *Responsibility for administration.* (a) The Commandant of the U. S. Coast Guard is vested with the responsibility and authority, under direction and supervision of the Secretary of the Treasury, for the administration of the act of March 2, 1929, the International Load Line Convention, 1930, and Coastwise Load Line Act 1935, as amended June 20, 1936.

§ 43.01–10 *Application of regulations.* (a) No merchant vessel of the United States of 150 gross tons, or over shall proceed to sea (Great Lakes excepted) and no foreign merchant vessel of 150 gross tons or over when within the jurisdiction of the United States shall proceed to sea (Great Lakes excepted), unless the vessel being:

(1) A foreign vessel and is exempted insofar as marking and certification of marks is concerned by section 5 of the Load Line Acts and § 43.01–97.

(2) A new vessel that:

(i) Has been surveyed in accordance with the provisions of § 43.01–50;

(ii) Complies with the provisions of this part as applicable to the type of vessel dealt with;

(iii) Has been marked in accordance with the provisions of this part; and,

(iv) Has had the marks certified as correct as provided by § 43.05–30.

(3) An existing vessel that:

(i) Has been surveyed, marked, and the marks certified either under the provisions of this part, as applicable to the type of vessel, or under one of the sets of rules particularized in § 43.40–15;

(ii) Complies, as defined for the type of vessel, with the provisions of this part in principle and also in detail, as far as is reasonable and practicable, having regard to the efficiency of (*a*) the protection of openings, (*b*) guard rails, (*c*) freeing ports, and (*d*) means of access to crews' quarters provided by the existing arrangements, fittings, and appliances on the vessel.

(iii) Where it is neither reasonable nor practicable to comply with the provisions in this part in their entirety, the assigning authority will, in each case, report to the Commandant, U. S. Coast Guard, the specific matters in which the vessel is deficient, together with such recommendations as may seem desirable. Upon receipt of this report the Commandant, U. S. Coast Guard shall determine such addition to the freeboard as will, in the judgment of the Commandant, U. S. Coast Guard, make the vessel as safe as if it had fully complied with this part.

CROSS REFERENCE: For definition of "a new vessel," and "an existing vessel," see § 43.01–25 (a).

§ 43.01–15 *Timber cargoes.* (a) A steamer (other than a tanker or a vessel assigned load lines on a tanker basis) which has been surveyed and marked as provided by §§ 43.01–10, 43.05–1—43.15–97, may on application by the owner be surveyed and marked with timber load lines applicable only when carrying timber deck cargoes, and the steamer when carrying a deck cargo complying with the provisions of §§ 43.25–5—43.25–70, may be loaded to the timber load line as determined by this part applicable to the voyage if being:

(1) A new steamer, it complies with the conditions and provisions prescribed in §§ 43.25–5—43.25–70.

(2) An existing steamer (other than one defined in § 43.01–15) if it complies with the conditions and provisions of §§ 43.25–5—43.25–70, (other than § 43.25–15), but the vessel shall comply in principle, so far as is reasonable and practical, with the conditions and provisions prescribed by § 43.25–15: *Provided,* That in assigning a timber load line to an existing steamer there shall be made such additions to the freeboard as shall be reasonable, having regard to the extent to which such steamer falls short of full compliance with the conditions and provisions prescribed in § 43.25–15.

(b) Existing vessels propelled by either sail or steam which have been specially constructed to carry complete cargoes of timber (that is, of the lumber schooner type) when carrying a complete cargo of timber will be marked with a load line. This load line will be applicable to all seasons and zones, and the assignment of and the certification of the load line will be made after consideration of the vessel's experience in similar voyages and of the condition of the vessel and her appliances. The conditions of assignment as required by §§ 43.25–5—43.25–70, are to be complied with so far as is reasonable and practicable. The Commandant, U. S. Coast Guard, shall approve the assignment of a load line for vessels of this type when such line is determined by experience.

(c) Existing steamers which have been specially constructed to carry complete cargoes of timber (that is, steam lumber schooner type) will be surveyed and marked and the marks certified in accordance with the conditions and provisions of §§ 43.01–10, 43.05–1—43.15–97, and these marks will be applicable when the steamers are engaged on voyages laden with a cargo other than a complete timber cargo.

(d) Existing sailing vessels of the lumber schooner type will be surveyed and marked and the marks certified in accordance with the conditions and provisions of §§ 43.01–10, 43.05–1—43.20–45, and these marks will be applicable when engaged on a voyage laden with cargo other than a complete timber cargo.

CROSS REFERENCE: For approval of Commandant, U. S. Coast Guard, see § 43.01–100.

§ 43.01–20 *Tankers.* (a) A steamer specially constructed for the carriage of liquid cargoes in bulk, which has been surveyed as provided by § 43.01–10, shall be marked with tanker load lines and the marks certified as correct if being:

(1) A new vessel, it complies with the conditions and provisions prescribed in §§ 43.30–1—43.30–70.

(2) An existing vessel, it complies with the conditions and provisions in §§ 43.30–5, 43.30–20—43.30–35, and, also in principle so far as is reasonable and practicable with §§ 43.30–10, 43.30–15, 43.30–40, providing that in assigning a tanker load line to an existing vessel such additions to the freeboard shall be made as is reasonable, having regard to the extent to which the vessel falls short of full compliance with the conditions and provisions prescribed in §§ 43.30–10, 43.30–15, 43.30–40.

§ 43.01–25 *New and existing vessels.* (a) For the purpose of marking and certification of load lines on the international form, a "new vessel" is one whose keel was laid on or after July 1, 1932, all other vessels being regarded as existing vessels.

(b) For the purpose of marking and certification of load lines on the coastwise form, a "new vessel" is one whose keel was laid:

(1) If of 4,000 gross tons and over, on or after November 27, 1935.

(2) If less than 4,000 gross tons, on or after August 27, 1936.

(3) All other vessels being regarded as existing vessels.

§ 43.01–30 *Vessels of special type.* (a) For steamers over 300 feet in length possessing constructional features similar to those of a tanker which afford extra invulnerability against the sea, a reduction in freeboard from that determined under §§ 43.15–1—43.15–97, may be granted.

(b) The amount of such reduction shall be determined by the assigning authority in relation to the freeboard assigned to tankers, having regard to the degree of compliance with the condition of assignment laid down for these vessels and the degree of subdivision provided. The freeboard assigned to such a vessel shall in no case be less than would be assigned to the vessel as a tanker.

(c) Before assignment or certification of the load lines for vessels of special type, the approval of the Commandant, U. S. Coast Guard, shall be obtained.

CROSS REFERENCE: For approval of the Commandant, U. S. Coast Guard, see § 43.01–100.

§ 43.01–35 *Marks to indicate load lines.* (a) Marks to indicate the maximum mean drafts to which a vessel can be lawfully submerged, in the various circumstances and seasons, shall be permanently marked on each side of the vessel in the form, manner, and location provided by this part.

§ 43.01–40 *Assignment and certification; assigning authority.* (a) As provided in the Load Line Acts approved March 2, 1929, and August 27, 1935, the American Bureau of Shipping is appointed to assign load lines and to determine whether the position of and the manner of marking each vessel to which the act applies has been performed in accordance with this part, and is authorized to issue a load line certificate, certifying to the correctness of the marks, under its own hand and seal. The American Bureau of Shipping is authorized to renew from time to time by indorsement a load line certificate. Load line certificates will not be issued until the load line marks have been verified. This certificate will be issued in duplicate, one copy being delivered to the owner or master of the vessel and one

copy, together with a summary of the data used to determine the load line, will be forwarded to the Commandant, U. S. Coast Guard, Washington, D. C. In addition, effective January 1, 1948, each new vessel, when receiving its first load line certificate, shall be furnished a copy of the load line survey report which shall be retained on board to be available for the information of inspectors and surveyors when carrying out subsequent load line surveys.

(b) The American Bureau of Shipping is referred to in this part as the assigning authority.

(c) The scale of maximum fees payable to the assigning authority for this service is contained in § 43.40–5.

§ 43.01–45 *Certification of existing load lines.* (a) Vessels required by the act of March 2, 1929, to have a load line and which have previous to September 2, 1930, been surveyed and marked in accordance with the British Board of Trade Rules of 1906, will be considered as having complied with the act of March 2, 1929 (45 Stat. 1492; 46 U. S. C. 85–85g), until such time (not later than September 2, 1931) as certification of the existing marks has been made, and the inspection requirements laid down in § 43.01–50 have been carried out for the purpose of insuring that:

(1) Alterations have not been made in the hull or superstructures that would affect the freeboard on which the original load line certificate was based.

(2) The conditions of assignment provided by this part are complied with so far as is considered reasonable and practicable by the assigning authority, and that the structural strength of the vessel has been maintained.

(b) If the provisions of this section have been complied with, the present load line certificate shall be indorsed by the American Bureau of Shipping to that effect and this indorsement shall limit the time of its validity, having regard to the condition of the vessel and her appliances. The Commandant, U. S. Coast Guard, shall be notified of every such indorsement and the date of its expiration.

CROSS REFERENCE: For titles of load line laws and rules regarded as equivalent to the British Board of Trade Rules, 1906, see § 43.40–15.

§ 43.01–50 *Surveys*—(a) *Steel vessels.* (1) The vessel is to be placed in dry dock to determine the condition of the hull plating, etc.

(2) The holds, 'tween decks, peaks, bilges, engine and boiler spaces, and bunkers are to be examined to determine the condition of the framing, etc.

(3) Deep tanks and other tanks which form part of the vessel are to be examined internally.

(4) Where a double bottom is fitted, the tanks are to be examined internally. Where double bottom and other tanks are used for fuel-oil bunkers, such tanks need not be cleaned out, provided the surveyors are able to determine by an external examination that their general condition is satisfactory.

(5) The decks are to be examined.

(6) The hatch covers, hatch beams, and fore-and-afters, tarpaulins, battens and wedges, the hatchway and ventilator coamings, companionways, the engine and boiler casings, the superstructures on the freeboard deck, and all means of protecting the openings in the freeboard deck and superstructures and bulkheads are to be examined.

(7) All air pipe outlets, scuppers, sanitary discharges in the vessel's sides, and air ports are to be examined.

(8) All gangways, cargo, and coaling ports or other similar openings in vessel's sides are to be examined.

(9) Guard rails, gangways, and shutters in freeing ports are to be examined.

(10) All eye plates or similar fittings for timber deck cargo lashings and sockets for uprights are to be examined.

(11) Where, owing to the age and condition of the vessel, the surveyors deem it necessary, the shell and deck plating may be required to be drilled in order to ascertain the then thickness of such plating.

(b) *Wood vessels.* (1) The vessel is to be placed on a dry dock or a slip way and the keel, stem, stern frame or stern post and outside planking are to be examined. Caulking is to be tried at such places about the planking as deemed necessary by the surveyors.

(2) Careful examination must be made for faulty fastenings and such bolts or treenails must be backed out, or otherwise dealt with, as may be deemed necessary by the surveyors.

(3) Careful examination is to be made of the entire structure and if considered necessary borings are to be made to ascertain the conditions of the materials; should these disclose cause for further examination, listings are to be made where required to satisfy the surveyors as to the true condition of the vessel.

(4) The holds, 'tween decks, peaks, bilges, engine and boiler spaces, and bunkers are to be examined.

(5) The decks are to be examined and bored where necessary.

(6) The hatch covers, hatch beams, fore-and-afters, tarpaulins, battens and wedges, the hatchway and ventilator coamings, companionways, the engine and boiler casings, the superstructures on the freeboard deck, and all means of protecting the openings in the freeboard deck and superstructures and bulkheads are to be examined.

(7) All air pipe outlets, scuppers, sanitary discharges in the vessel's sides, and air ports are to be examined.

(8) All gangways, cargo, and coaling ports or other similar fittings in the vessel's sides are to be examined.

(9) Guard rails, gangways, and shutters in freeing ports are to be examined.

(10) All eye plates or similar fittings for timber deck cargo lashings and sockets for uprights are to be examined.

(c) *Correction of deficiencies.* (1) Any such parts or fittings of the vessel as are found to be in an unsatisfactory condition are to be repaired or renewed in order to place the vessel in a seaworthy condition so as to be eligible for a load line certificate.

§ 43.01–55 *Annual inspection.* (a) A vessel having been marked as provided by this part, and the mark certified as correct, will be inspected at intervals of approximately 12 months in order to insure the maintenance in an effective condition of the fittings and appliances for the:

(1) Protection of openings,

(2) guard rails,

(3) freeing ports,

(4) means of access to crews' quarters, and

(5) that there have not been alterations made to the hull or superstructures which would affect the calculations determining the position of the load lines.

(b) The American Bureau of Shipping is appointed to make this inspection and to report thereon to the owners of the vessel, a copy of this report being forwarded to the Commandant, U. S. Coast Guard, Washington, D. C.

(c) The scale of fees payable to the American Bureau of Shipping for this service is contained in § 43.40–5.

§ 43.01–60 *Application for assignment, renewal, and certification.* (a) Application for assignment and certification of load line marks or for renewal of load line certificates shall be made in writing to the American Bureau of Shipping by the owners of the vessel.

(b) Application for the assignment of load lines to a foreign vessel belonging either to a country ratifying the International Load Line Convention, 1930, or to a country with which the United States has reciprocal load line agreement in effect shall be made by the Government to which the vessel belongs, otherwise load lines shall not be assigned such a vessel under this part.

§ 43.01–65 *Application for annual inspection.* (a) Application for annual load line inspection required by § 43.01–55 shall be made in writing to the American Bureau of Shipping by the owners of a vessel.

§ 43.01–70 *Equivalents.* (a) Where in this part it is provided that a particular fitting or appliance, or type thereof, shall be fitted or carried in a vessel, or that any particular arrangement shall be adopted, there may be substituted any other fitting or appliance or type thereof, or any other arrangement: *Provided,* That such fittings, appliance, or arrangement shall be considered a suitable equivalent by the assigning authority and the approval of the Commandant, U. S. Coast Guard, for such substitution shall have been issued.

CROSS REFERENCE: For approval of Commandant, U. S. Coast Guard, see § 43.01–100.

§ 43.01–75 *Validity and renewal of certificates.* (a) As the assignment of load lines is conditioned upon the structural efficiency of the vessel and upon the provision of effective protection to vessel and crew, every vessel required to be marked by the acts of March 2, 1929, and August 27, 1935, as amended June 20, 1936 (45 Stat. 1492, 49 Stat. 888, 1543; 46 U. S. C. 85–85g, 88–88i), with load lines shall be surveyed by the assigning authority at least once in each 5 years to determine that the load lines are then correctly placed as required by this part. If the load line mark be found correct for the vessel in the condition she is then in,

the certificate shall be renewed for such time as the condition of the vessel then warrants, but in no case for a longer period than 5 years and the facts shall be attested by indorsement upon the back of the certificate in the form shown in § 43.40–10.

(b) Foreign vessels belonging to countries which have not ratified the Load Line Convention and which have not been exempted pursuant to section 5 of the Load Line Act (45 Stat. 1493; 46 U. S. C. 85d) shall have their load line certificate limited to a period of 1 year. The certificate may be validated for additional 1-year periods: *Provided*, That the condition of the vessel then warrants, and the facts are attested by indorsement upon the back of the load line certificate by a surveyor of the American Bureau of Shipping or of the classification society issuing the certificate. The certificate will become void 5 years from date of issue, or at the expiration of the fourth yearly validation, whichever occurs first.

(c) The Commandant, U. S. Coast Guard, shall be notified of every renewal indorsement and the date of its expiration.

§ 43.01–80 *Forms of certificates.* (a) The form of certificate certifying to the correctness of the load line mark assigned under the regulations in this part shall be as shown in § 43.40–10, as follows:

(1) International load line certificate issued to United States vessels engaged in foreign voyages, applicable as stated:

(i) A_1 For General use.

(ii) A_2 For sailing vessels.

(iii) A_3 General use combined with timber deck cargo.

(2) For foreign vessels belonging to countries that have not ratified or acceded to the International Load Line Convention, 1930:

(i) B for general use.

(3) Coastwise load line certificate issued to United States vessels engaged solely in coastwise voyages (other than special services provided for by Part 44 of this subchapter).

(i) C_1 For general use.

(ii) C_2 For sailing ships.

(iii) C_3 General use combined with timber deck cargo.

(b) The assigning authority may provide forms similar to the above, these forms to be approved by the Commandant, U. S. Coast Guard, before being issued.

CROSS REFERENCE: For forms of load line certificates, see §§ 43.40–10, 44.05–35 of this subchapter.

§ 43.01–85 *Cancellation of certificate.* (a) Notwithstanding the marking of a load line and the issuance of a load line certificate, the certificate will be canceled if:

(1) The annual load line inspection required by § 43.01–55 has not been carried out or that the items described under § 43.01–55 (a) (1), (2), (3), and (4) are not maintained in an effective condition.

(2) The survey required by § 43.01–50 has not been carried out or that any defects disclosed by the survey have not been corrected.

(3) Due to any cause the conditions of assignment have not been maintained as provided by this part, or alterations have been made to hull or superstructures which affect the calculations made to determine the location of the load line.

§ 43.01–90 *Zones and seasonal areas.* (a) A vessel coming under the provisions of the acts of March 2, 1929, as amended (45 Stat. 1492; 46 U. S. C. 85–85g), and August 27, 1935, as amended (49 Stat. 888; 46 U. S. C. 88–88l), shall conform to the conditions applicable to the zones and seasonal areas described in § 43.40–1.

(b) A port located on the boundary line between two zones shall be regarded as within the zone from which the vessel arrived or into which the vessel departs.

(c) No vessel to which these acts apply shall be loaded so as to submerge the load line then applicable to her voyage. When loading a vessel in a favorable zone for a voyage on which the vessel will enter a less favorable zone, such allowance must be made that the vessel, when crossing into the less favorable zone, will conform to the regulations and freeboard for the less favorable zone.

§ 43.01–95 *Log book entries.* (a) The master of a vessel subject to the regulations in this part shall note in the vessel's official log the data required by section 6 of the Load Line Act of March 2, 1929, as amended (45 Stat. 1494; 46 U. S. C. 85e), and for coastwise voyages he shall note in the vessel's log the data required by section 6 of the Coastwise Load Line Act, 1935, as amended (49 Stat. 889; 46 U. S. C. 88e); that is, before departing from her loading port or place, the position of the load line mark, port and starboard, as applicable to the voyage and the actual drafts of the vessel forward and aft at the time of departing from port as nearly as the same can be ascertained.

§ 43.01–97 *Control.* (a) The Collector of Customs may detain a vessel for survey if he has reason to believe that the vessel is proceeding on her journey in excess of the draft allowed by the regulations in this part as indicated by the vessel's load line certificate, or otherwise. Immediately upon ordering a vessel detained, the Collector of Customs shall inform the Coast Guard District Commander thereof, who shall thereupon advise the collector whether or not he deems that the vessel may proceed to sea with safety. The Coast Guard District Commander may detain a vessel if it is so loaded as to be manifestly unsafe to proceed to sea, without advice thereof from the Collector of Customs. However, in such case, immediate notice of such detention shall be furnished the Collector of Customs so that clearance may be withheld.

(b) In the case of retention of a vessel, which shall be by written order, the detaining officer will immediately arrange for a survey in the manner prescribed by section 7 of the Load Line Act of March 2, 1929 (45 Stat. 1494; 46 U. S. C. 85f), and of the Coastwise Load Line Act, 1935 (49 Stat. 889; 46 U. S. C. 88f). In the case of such a survey, the detaining officer shall appoint three disinterested surveyors and, where practicable, one of them shall be from the Surveying Staff of the American Bureau of Shipping. Where such surveyors are appointed by the Collector of Customs, such appointments shall be with the approval of the Coast Guard District Commander. Whenever a vessel is detained the master may, within five days, appeal to the Commandant, U. S. Coast Guard, who may, if he desires, order a further survey and may affirm, set aside, or modify the order of the detaining officer.

(c) Where a foreign vessel is detained or any action is taken which would appear likely to result in legal proceedings being taken against such a vessel, the consul of the country to which the vessel belongs shall be informed as soon as possible of the circumstances of the case.

(d) Pursuant to the provisions of sections 5 of the Load Line Act of March 2, 1929, as amended (45 Stat. 1493; 46 U. S. C. 85d), and the Coastwise Load Line Act, 1935 as amended (49 Stat. 889; 46 U. S. C. 88d), it is hereby certified that a vessel of a foreign country which has ratified the International Load Line Convention, 1930, shall be deemed a vessel of a foreign country as described in sections 5 of the cited acts, and such a vessel shall be exempt from the provisions of the regulations in this part insofar as the marketing of the load lines and the certificating thereof are concerned, only so long as such country similarly recognizes the load lines established by the regulations in this part, for the purpose of a voyage by sea: *Provided*, That the vessel is marked with load lines and has on board a valid load line certificate certifying to the correctness of the mark, the vessel shall not be loaded beyond the limits allowed by the certificate, the position of the load line of the vessel shall correspond with the certificate, the hull and superstructure shall not have been so materially altered as to affect the calculations on which the load line was based, and alterations have not been made so that the protection of openings, guard rails, freeing ports, and means of access to crew's quarters, have made the vessel manifestly unfit to proceed to sea without danger to human life.

CROSS REFERENCE: For regulation concerning surveys on both steel and wooden vessels, see § 43.01–50.

§ 43.01–100 *Approval of Commandant, U. S. Coast Guard.* (a) Where the active approval of the Commandant, U. S. Coast Guard is required in connection with this part, such information as will enable the Commandant, U. S. Coast Guard to obtain a comprehensive understanding of the question at issue shall be furnished and will remain with the Commandant, U. S. Coast Guard as a record.

SUBPART 43.05—GENERAL RULES FOR DETERMINING MAXIMUM LOAD LINES OF MERCHANT VESSELS

NOTE: The rules necessarily assume that the nature and stowage of the cargo, ballast, etc., are such as to secure sufficient stability for the vessel.

§ 43.05–1 *Definitions*—(a) *Steamer.* (1) The term "steamer" or "steamship" includes all vessels having sufficient means for mechanical propulsion, except where provided with sufficient sail area for navigation under sails alone.

(2) A vessel fitted with mechanical means of propulsion and with sail area insufficient for navigation under sails alone may be assigned a load line under §§ 43.15–1—43.15–97.

(3) A lighter, barge, or other vessel without independent means of propulsion, when towed, is to be assigned a load line under §§ 43.15–1—43.15–97.

(b) *Sailing vessel.* The term "sailing vessel" includes all vessels provided with sufficient sail area for navigation under sails alone, whether or not fitted with mechanical means of propulsion.

(c) *Flush-deck vessel.* A flush-deck vessel is one which has no superstructure on the freeboard deck.

(d) *Superstructure.* A superstructure is a deck structure on the freeboard deck extending from side to side of the vessel. A raised quarter-deck is considered a superstructure.

(e) *Load line.* The load line is the line defining the maximum mean draft to which a vessel may be lawfully submerged. It is the lower limit of the freeboard as determined by the regulations in this part having regard to the various conditions and seasons.

(f) *Freeboard.* The freeboard assigned is the distance measured vertically downward at the side of the vessel amidships from the upper edge of the deck line to the upper edge of the load line.

(g) *Freeboard deck.* The freeboard deck is the deck from which the freeboard is measured, and is the uppermost complete deck having permanent means of closing all openings in weather portions of the deck in accordance with §§ 43.10–1—43.10–45. It is the upper deck in flush-deck vessels and vessels with detached superstructures. In vessels having discontinuous freeboard decks within superstructures which are not intact, or which are not fitted with class 1 closing appliances, the lowest line of the deck below the superstructure deck is taken as the freeboard deck.

(h) *Amidships.* Amidships is the middle of the length of the summer load water line, as defined in § 43.15–1.

§ 43.05–5 *Deck line.* (a) The deck line is a horizontal line 12 inches in length and 1 inch in breadth. It is to be marked amidships on each side of the vessel, and its upper edge is to pass through the point where the continuation outward of the upper surface of the freeboard deck intersects the outer surface of the shell. (See fig. 43.05–5 (a).) Where the deck is partly sheathed amidships, the upper edge of the deck line is to pass through the point where the continuation outward of the upper surface of the actual sheathing at amidships intersects the outer surface of the shell.

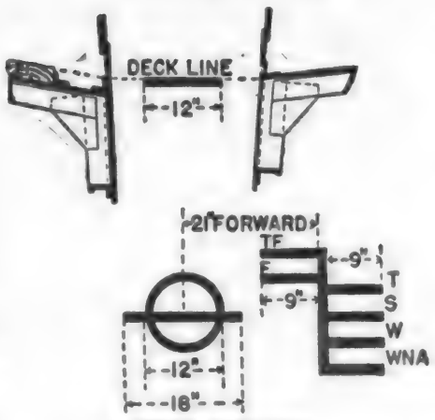


FIGURE 43.05–5(a)

§ 43.05–10 *Load line disk.* (a) The load line disk is 12 inches in diameter and is intersected by a horizontal line 18 inches in length and 1 inch in breadth, the upper edge of which passes through the center of the disk. The disk is to be marked amidships below the deck line.

§ 43.05–15 *Lines used with disk.* (a) The lines which indicate the maximum load line in different circumstances and in different seasons (see § 43.40–1) are to be horizontal lines, 9 inches in length and 1 inch in breadth, which extend from, and are at right angles to, a vertical line marked 21 inches forward of the center of the disk. (See figure 43.05–5 (a).)

(b) The following are the lines to be used:

(1) *Summer load line.* The summer load line is indicated by the upper edge of the line which passes through the center of the disk and also by a line marked "S."

(2) *Winter load line.* The winter load line is indicated by the upper edge of a line marked "W."

(3) *Winter North Atlantic load line.* The winter North Atlantic load line is indicated by the upper edge of a line marked "WNA."

(4) *Tropical load line.* The tropical load line is indicated by the upper edge of a line marked "T."

(5) *Fresh-water load lines.* The fresh-water load line in summer is indicated by the upper edge of a line marked "F." The difference between the fresh-water load line in summer and the summer load line is the allowance to be made for loading in fresh water at the other load lines. The tropical fresh-water load line is indicated by the upper edge of a line marked "TF."[3] (This provision for deeper loading in fresh water is not applicable to the Great Lakes.)

(c) Where the draft is restricted on a basis of subdivision or stability and this draft is less than any of the various seasonal drafts permitted by this part the center of the disk shall be located on the line of this restricted draft and it shall be applicable to all zones and seasons. If such a permissible maximum draft comes between the seasonal markings, the seasonal markings below shall also be added. A fresh-water load line may be marked forward of the disk as provided in this section.

[3] Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

§ 43.05–20 *Mark of assigning authority.* (a) The authority by whom the load lines are assigned may be indicated by letters measuring about 4½ by 3 inches marked alongside the disk and above the center line.

§ 43.05–25 *Details of marking.* (a) The disk, lines, and letters are to be painted in white or yellow on a dark ground or in black on a light ground. They are also to be carefully cut in or center punched on the sides of iron and steel vessels, and on wood vessels they are to be cut into the planking for at least one-eighth of an inch. The marks are to be plainly visible, and, if necessary, special arrangements are to be made for this purpose.

§ 43.05–30 *Verification of marks.* (a) The load lines certificate is not to be delivered to the vessel until a surveyor of the assigning authority has certified that the marks are correctly and permanently indicated on the vessel's side.

SUBPART 43.10—CONDITIONS OF ASSIGNMENT OF LOAD LINES

§ 43.10–1 *Construction of vessel.* (a) The assignment of load lines is conditional upon the vessel being structurally efficient and upon the provision of effective protection to vessel and crew.

(b) Sections 43.10–1—43.10–100 apply to vessels to which minimum freeboards are assigned. In vessels to which greater freeboards than the minimum are assigned, the protection is to be relatively as effective.

(c) Passenger vessels; subdivision and stability load lines: Where in passenger vessels the position of the maximum load lines are determined by the application of subdivision and stability regulations as provided in Part 46 of this subchapter the provisions of this part shall also be effective insofar as they are applicable.

§ 43.10–5 *Cargo and other hatchways not protected by superstructures.* (a) The construction and fitting of cargo and other hatchways in exposed positions on freeboard and superstructure decks are to be at least equivalent to the standards laid down in §§ 43.10–10—43.10–45.

§ 43.10–10 *Hatchway coamings.* (a) The height of hatchway coamings on freeboard decks is to be at least 24 inches above the deck. The height of coamings on superstructure decks is to be at least 24 inches above the deck if situated within a quarter of the ship's length from the stem, and at least 18 inches if situated elsewhere.

(b) Coamings are to be of steel, are to be substantially constructed and, where required to be 24 inches high, are to be fitted with an efficient horizontal stiffener placed not lower than 10 inches below the upper edge, and fitted with efficient brackets or stays from the stiffener to the deck, at intervals of not more than 10 feet. Where end coamings are pro-

tected, the requirements of this section may be modified.

§ 43.10–15 *Hatchway covers.* (a) Covers to exposed hatchways are to be efficient, and where they are made of wood, the finished thickness is to be at least 2⅜ inches in association with a span of not more than 5 feet. The width of each bearing surface for these hatchway covers is to be at least 2½ inches.

§ 43.10–20 *Hatchway beams and fore-and-afters.* (a) Where wood hatchway covers are fitted the hatchway beams and fore-and-afters are to be of the scantlings and spacing given in Table 43.10–20 (a1) where coamings 24 inches high are required, and as given in Table 43.10–20 (a2) where coamings 18 inches high are required. Angle bar mountings on the upper edge are to extend continuously for the full length of each beam. Wood fore-and-afters are to be steel shod at all bearing surfaces.

TABLE 43.10–20 (a1).—HATCHWAY BEAMS AND FORE-AND-AFTERS FOR VESSELS 200 FEET OR MORE IN LENGTH [1]

HATCHWAY BEAMS

[Coamings 24 inches in height]

Breadth of hatchway	Mounting	Beams with fore-and-afters, spacing center to center			Beams without fore-and-afters, spacing center to center	
		6′ 0″	8′ 0″	10′ 0″	4′ 0″	5′ 0″
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
10′ 0″	3 by 3 by 0.40A	11 by 0.30P	12 by 0.32P	14 by 0.34P	9 by 0.46BP	10 by 0.50BP.
12′ 0″	3 by 3 by 0.40A	12 by 0.32P	14 by 0.34P	17 by 0.36P	11 by 0.50BP	12 by 0.50BP.
14′ 0″	3 by 3 by 0.42A	14 by 0.34P	17 by 0.36P	20 by 0.38P	12 by 0.50BP	12 by 0.32P.
16′ 0″	3½ by 3 by 0.42A	16 by 0.36P	19 by 0.38P	22 by 0.38P	12 by 0.32P	14 by 0.34P.
18′ 0″	4 by 3 by 0.44A	18 by 0.36P	21 by 0.38P	25 by 0.40P	14 by 0.34P	16 by 0.36P.
20′ 0″	4 by 3 by 0.44A	20 by 0.38P	24 by 0.40P	28 by 0.42P	15 by 0.34P	18 by 0.36P.
22′ 0″	4½ by 3 by 0.46A	22 by 0.38P	26 by 0.42P	30 by 0.44P	16 by 0.36P	19 by 0.36P.
24′ 0″	5 by 3½ by 0.46A	23 by 0.40P	28 by 0.42P	32 by 0.44P	17 by 0.36P	20 by 0.38P.
26′ 0″	5½ by 3½ by 0.48A	24 by 0.40P	29 by 0.42P	34 by 0.46P	18 by 0.36P	21 by 0.38P.
28′ 0″	6 by 3½ by 0.50A	25 by 0.40P	31 by 0.44P	36 by 0.48P	19 by 0.38P	22 by 0.38P.
30′ 0″	6 by 3½ by 0.52A	26 by 0.42P	32 by 0.44P	38 by 0.48P	20 by 0.38P	23 by 0.40P.

FORE-AND-AFTERS

Length of fore-and-afters	Mounting	Bulb plate center fore-and-afters, spacing center to center			Bulb angle side fore-and-afters, spacing center to center		
		3′ 0″	4′ 0″	5′ 0″	3′ 0″	4′ 0″	5′ 0″
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6′ 0″	2½ by 2½ by 0.36	6 by 0.36	6½ by 0.38	7 by 0.38	6 by 3 by 0.36	6½ by 3½ by 0.38	7 by 3½ by 0.38.
8′ 0″	2½ by 2½ by 0.38	7 by 0.42	8 by 0.44	9 by 0.44	7 by 3½ by 0.42	8 by 3 by 0.44	9 by 3½ by 0.44.
10′ 0″	2½ by 2½ by 0.40	8 by 0.50	9½ by 0.50	11 by 0.50	8 by 3½ by 0.50	9½ by 3½ by 0.50	11 by 3½ by 0.50.

Length of fore-and-afters	Wood center fore-and-afters, spacing center to center						Wood side fore-and-afters, spacing center to center					
	3′ 0″		4′ 0″		5′ 0″		3′ 0″		4′ 0″		5′ 0″	
	D	B	D	B	D	B	D	B	D	B	D	B
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6′ 0″	5½	7	6	7	6½	7	5½	5½	6	6	6½	6
8′ 0″	6½	7	7½	7	8	7	6½	6½	7½	7	8	7
10′ 0″	8	7	8½	8	9	9	8	7	8½	8	9	9

A=Plain angle. BP=Bulb plate. P=Plate. D=Depth. B=Breadth.

[1] In vessels not exceeding 100 feet in length, the depths of beams which are formed of plates and angles may be 60 percent of the depths given above; the depths of beams and steel fore-and-afters formed of bulb angle or bulb plate section may be 80 percent of the depths given above; the thickness of plates, bulb angles, and bulb plates should correspond to the thickness tabulated for the reduced depths with a minimum thickness of 0.30 inch; the depths and breadths of wood fore-and-afters may be 80 percent of those given in the tables for side fore-and-afters, but the center fore-and-afters must be not less than 6½ inches wide. In vessels between 100 feet and 200 feet in length, the sizes of the beams and fore-and-afters are to be determined by linear interpolation.

[2] Depths for hatchway beams are at the middle of the length and are measured from the top mounting to the lower edge. Depths for fore-and-afters are measured from the underside of the hatch covers to the lower edge. Sizes for intermediate lengths and spacing are obtained by interpolation. Where plates are specified, two angles of the size given for mountings, are to be fitted at the upper and at the lower part of the beam. Where bulb plates are specified, two angles, of the size given for mountings, are to be fitted at the upper part of the beam or fore-and-after. Where bulb angles are specified, one angle, of the size given for mountings, is to be fitted at the upper part of the section. Where the specified flanges of an angle are of different dimensions, the larger flange is to be horizontal.

TABLE 43.10–20 (a2).—HATCHWAY BEAMS AND FORE-AND-AFTERS FOR VESSELS 200 FEET OR MORE IN LENGTH [1]

HATCHWAY BEAMS

[Coamings 18 inches in height]

Breadth of hatchway	Mounting	Beams with fore-and-afters, spacing center to center			Beams without fore-and-afters, spacing center to center	
		6′ 0″	8′ 0″	10′ 0″	4′ 0″	5′ 0″
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
10′0″	3 by 3 by 0.40A	9½ by 0.46BP	10½ by 0.50BP	11½ by 0.52BP	8 by 0.40 BP	9 by 0.44BP.
12′0″	3 by 3 by 0.40A	11 by 0.50BP	11 by 0.30P	13 by 0.34P	9 by 0.44BP	10 by 0.50BP.
14′0″	3 by 3 by 0.42A	11 by 0.30P	13 by 0.32P	15 by 0.34P	10 by 0.50BP	11½ by 0.50BP.
16′0″	3½ by 3 by 0.42A	12 by 0.32P	15 by 0.34P	17 by 0.36P	11 by 0.30P	11 by 0.30P.
18′0″	4 by 3 by 0.44A	14 by 0.34P	17 by 0.36P	19 by 0.38P	11 by 0.30P	12 by 0.32P.
20′0″	4 by 3 by 0.44A	16 by 0.36P	19 by 0.38P	21 by 0.38P	12 by 0.32P	13 by 0.34P.
22′0″	4½ by 3 by 0.46A	17 by 0.36P	20 by 0.38P	23 by 0.40P	12½ by 0.32P	14 by 0.34P.
24′0″	5 by 3½ by 0.46A	18 by 0.36P	21 by 0.38P	25 by 0.40P	13 by 0.34P	14½ by 0.34P.
26′0″	5½ by 3½ by 0.48A	19 by 0.38P	22 by 0.38P	26 by 0.42P	13½ by 0.34P	15 by 0.34P.
28′0″	6 by 3½ by 0.50A	20 by 0.38P	23 by 0.40P	27 by 0.42P	14 by 0.34P	16 by 0.36P.
30′0″	6 by 3½ by 0.52A	21 by 0.38P	24 by 0.40P	28 by 0.42P	15 by 0.34P	17 by 0.36P.

See footnote at end of table.

FORE-AND-AFTERS

Length of fore-and-afters	Mounting	Bulb plate center fore-and-afters, spacing center to center			Bulb angle side fore-and-afters, spacing center to center		
		3' 0"	4' 0"	5' 0"	3' 0"	4' 0"	5' 0"
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6' 0"	2½ by 2½ by 0.36	5 by 0.34	5½ by 0.34	6 by 0.36	5 by 3 by 0.36	5½ by 3 by 0.34	6 by 3 by 0.36.
8' 0"	2½ by 2½ by 0.38	6 by 0.38	7 by 0.40	7½ by 0.42	6 by 3 by 0.38	7 by 3 by 0.40	7½ by 3½ by 0.42.
10' 0"	2½ by 2½ by 0.40	7 by 0.44	8 by 0.46	9 by 0.50	7 by 3 by 0.44	8 by 3½ by 0.46	9 by 3½ by 0.50.

Length of fore-and-afters	Wood center fore-and-afters, spacing center to center						Wood side fore-and-afters, spacing center to center					
	3' 0"		4' 0"		5' 0"		3' 0"		4' 0"		5' 0"	
	D	B	D	B	D	B	D	B	D	B	D	B
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6' 0"	5	7	5½	7	6	7	5	5	5½	5	6	5
8' 0"	6	7	6½	7	7	7	6	5	6½	6	7	6
10' 0"	7	7	7½	7	8	7	[3]	6	7½	7	8	7

A=Plain angle. BP=Bulb plate. P=Plate. D=Depth. B=Breadth.

[1] In vessels not exceeding 100 feet in length, the depths of beams which are formed of plates and angles may be 60 percent of the depths given above; the depths of beams and steel fore-and-afters formed of bulb angle or bulb plate section may be 80 percent of the depths given above; the thickness of plates, bulb angles, and bulb plates should correspond to the thickness tabulated for the reduced depths with a minimum thickness of 0.30 inch; the depths and breadths of wood fore-and-afters may be 80 percent of those given in the tables for side fore-and-afters, but the center fore-and-afters must be not less than 6½ inches wide. In vessels between 100 feet and 200 feet in length, the sizes of the beams and fore-and-afters are to be determined by linear interpolation.

[3] Depths for hatchway beams are at the middle of the length and are measured from the top mounting to the lower edge. Depths for fore-and-afters are measured from the under side of the hatch covers to the lower edge. Sizes for intermediate length and spacing are obtained by interpolation. Where plates are specified, two angles, of the sizes given for mountings, are to be fitted at the upper and at the lower part of the beam. Where bulb plates are specified, two angles, of the size given for mountings, are to be fitted at the upper part of the beam or fore-and-after. Where bulb angles are specified, one angle, of the size given for mountings, is to be fitted at the upper part of the section. Where the specified flanges of an angle are of different dimensions, the larger flange is to be horizontal.

§ 43.10–25 *Carriers or sockets.* (a) Carriers or sockets for hatchway beams and fore-and-afters are to be of steel at least one-half inch thick, and are to have a width of bearing surface of at least 3 inches.

§ 43.10–30 *Cleats.* (a) Strong cleats at least 2½ inches wide are to be fitted at intervals of not more than 2 feet from center to center; the end cleats are to be placed not more than 6 inches from each corner of the hatchway.

§ 43.10–35 *Battens and wedges.* (a) Battens and wedges are to be efficient and in good condition.

§ 43.10–40 *Tarpaulins.* (a) At least two tarpaulins in good condition, thoroughly waterproofed and of ample strength, are to be provided for each hatchway in an exposed position on freeboard and superstructure decks. The material is to be guaranteed free from jute, and shall not be less than No. 4 cotton canvas or No. 6 hemp canvas before waterproofing.

§ 43.10–45 *Security of hatchway covers.* (a) At all hatchways in exposed positions on freeboard and superstructure decks ring bolts or other fittings for lashings are to be provided.

(b) Where the breath of the hatchway exceeds 60 percent of the breadth of the deck in way of the hatchway, and the coamings are required to be 24 inches high, fittings for special lashings are to be provided for securing the hatchway covers after the tarpaulins are battened down.

§ 43.10–50 *Cargo and other hatchways in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.* (a) The construction and fittings of such hatchways are to be at least equivalent to the standards laid down in § 43.10–55.

§ 43.10–55 *Hatchway coamings and closing arrangements.* (a) Cargo, coaling, and other hatchways in the freeboard deck within superstructures which are fitted with class 2 closing appliances are to have coamings at least 9 inches in height and closing arrangements as effective as those required for exposed cargo hatchways whose coamings are 18 inches high.

(b) Where the closing appliances are less efficient than class 2, the hatchways are to have coamings at least 18 inches in height, and are to have fittings and closing arrangements as effective as those required for exposed cargo hatchways.

CROSS REFERENCE: For class 1 and class 2 closing appliances, see §§ 43.15–37, 43.15–40.

§ 43.10–60 *Machinery space openings in exposed positions on freeboard and raised quarter-decks.* (a) Such openings are to be properly framed and efficiently enclosed by steel casings of ample strength, and where the casings are not protected by other structures their strength is to be specially considered. Doors in such casings are to be of steel, efficiently stiffened, permanently attached, and capable of being closed and secured from both sides. The sills of openings are to be at least 24 inches above the freeboard deck and at least 18 inches above the raised quarter-deck.

(b) Fiddley, funnel, and ventilator coamings are to be as high above the deck as is reasonable and practicable. Fiddley openings are to have strong steel covers permanently attached in their proper positions.

§ 43.10–65 *Machinery space openings in exposed positions on superstructure decks other than raised quarter-decks.* (a) Such openings are to be properly framed and efficiently inclosed by strong steel casings. Doors in such cases are to be strongly constructed, permanently attached, and capable of being closed and secured from both sides. The sills of the openings are to be at least 15 inches above superstructure decks.

(b) Fiddley, funnel, and ventilator coamings are to be as high above the deck as is reasonable and practicable. Fiddley openings are to have strong steel covers permanently attached in their proper positions.

§ 43.10–67 *Machinery space openings in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.* (a) Such openings are to be properly framed and efficiently inclosed by steel casings. Doors in such casings are to be strongly constructed, permanently attached, and capable of being securely closed. The sills of the openings are to be at least 9 inches above the deck where the superstructures are closed by class 2 closing appliances, and at least 15 inches above the deck where the closing appliances are less efficient than class 2.

CROSS REFERENCES: For class 1 and class 2 closing appliances, see §§ 43.15–37, 43.15–40.

§ 43.10–70 *Flush bunker scuttles.* (a) Flush bunker scuttles may be fitted in superstructure decks, and where so fitted are to be of iron or steel, of substantial construction, with screw or bayonet joints. Where a scuttle is not secured by hinges, a permanent chain attachment is to be provided. The position of flush bunker scuttles in small vessels in special trades is to be dealt with by each assigning authority.

§ 43.10–75 *Companionways.* (a) Companionways in exposed positions on freeboard decks and on decks of inclosed superstructures are to be of substantial construction. The sills of the doorways are to be of the heights specified for hatchway coamings (see §§ 43.10–10, 43.10–55). The doors are to be strongly

constructed and capable of being closed and secured from both sides. Where the companionway is situated within a quarter of the vessel's length from the stem, it is to be of steel and riveted to the deck plating.

§ 43.10–77 *Ventilators in exposed positions on freeboard and superstructure decks.* (a) Such ventilators to spaces below freeboard decks or decks of superstructures which are intact or fitted with class 1 closing appliances are to have coamings of steel, substantially constructed, and efficiently connected to the deck by rivets spaced four diameters apart center to center, or by equally effective means. The deck plating at the base of the coamings is to be efficiently stiffened between the deck beams. The ventilator openings are to be provided with efficient closing arrangements.

(b) Where such ventilators are situated on the freeboard deck, or on the superstructure deck within a quarter of the vessel's length from the stem, and the closing arrangements are of a temporary character, the coamings are to be at least 36 inches in height; in other exposed positions on the superstructure deck they are to be at least 30 inches in height. Where the coaming of any ventilator exceeds 36 inches in height, it is to be specially supported and secured.

§ 43.10–80 *Air pipes.* (a) Where the air pipes to ballast and other tanks extend above the freeboard or superstructure decks, the exposed parts of the pipes are to be of substantial construction; the height from the deck to the opening is to be at least 36 inches in wells on freeboard decks, 30 inches on raised quarter decks, and 18 inches on other superstructure decks. Satisfactory means are to be provided for closing the openings of the air pipes.

§ 43.10–85 *Gangway, cargo, and coaling ports.* (a) Openings in the sides of vessels below the freeboard deck are to be fitted with watertight doors or covers, which, with their securing appliances, are to be of sufficient strength.

§ 43.10–87 *Scuppers and sanitary discharge pipes.* (a) Discharges from scuppers and sanitary pipes led through the vessel's sides from spaces below the freeboard deck are to be fitted with efficient and accessible means for preventing water from passing inboard. Each separate discharge may have an automatic nonreturn valve with a positive means of closing it from a readily accessible position above the freeboard deck, or two automatic nonreturn valves without positive means of closing, provided the upper valve is situated so that it is always accessible for examination under service conditions. The positive-action valve is to be accessible and is to be provided with means for showing whether the valve is opened or closed.

(b) Conditional upon the type and the location of the inboard ends of such openings, similar provisions may be prescribed by the assigning authority as to discharge from spaces within inclosed superstructures.

(c) Where scuppers are fitted in superstructures not fitted with class 1 closing appliances they are to have efficient means for preventing the accidental admission of water below the freeboard deck.

§ 43.10–90 *Air ports.* (a) Air ports to spaces below the freeboard deck or to spaces below the superstructure deck of superstructures closed by class 1 or class 2 closing appliances are to be fitted with efficient inside deadlights permanently attached in their proper positions so that they can be effectively closed and secured watertight.

(b) Where, however, such spaces in superstructures are appropriated to passengers other than steerage passengers or to crew, the air ports may have portable deadlights stowed adjacent to the air ports, provided they are readily accessible at all times on service.

(c) The air ports and deadlights are to be of substantial and approved construction.

CROSS REFERENCE: For class 1 and class 2 closing appliances, see §§ 43.15–37, 43.15–40.

§ 43.10–95 *Guard rails.* (a) Efficient guard rails or bulwarks are to be fitted on all exposed portions of freeboard and superstructure decks.

§ 43.10–97 *Freeing ports.* (a) Where bulwarks on the weather portions of freeboard or superstructure decks form "wells" ample provision is to be made for rapidly freeing the decks of water and for draining them. The minimum freeing port area on each side of the vessel for each well on the freeboard deck and on the raised quarter-deck is to be that given by the following scale: The minimum area for each well on any other superstructure deck is to be one-half the area given by the scale. Where the length of the well exceeds 0.7 *L*, the scale may be modified.

SCALE OF FREEING PORT AREA

Length of bulwarks in "well" in feet:	*Freeing port area on each side in square feet*
15	8.0
20	8.5
25	9.0
30	9.5
35	10.0
40	10.5
45	11.0
50	11.5
55	12.0
60	12.5
65	13.0
Above 65	(1)

[1] One square foot for each additional 5 feet length of bulwark.

(b) The lower edges of the freeing ports are to be as near the deck as practicable and preferably not higher than the upper edge of the gunwale bar. Two-thirds of the freeing port area required is to be provided in the midship half of the well. In vessels with less than the standard sheer the freeing port area is to be suitably increased.

(c) All such openings in the bulwarks are to be protected by rails or bars spaced about 9 inches apart. If shutters are fitted to freeing ports, ample clearance is to be provided to prevent jamming. Hinges are to have brass pins.

§ 43.10–100 *Protection of crew.* (a) Gangways, life lines, or other satisfactory means are to be provided for the protection of the crew in getting to and from their quarters. The strength of houses for the accommodation of crew on flush deck steamers is to be equivalent to that required for superstructure bulkheads.

SUBPART 43.15—LOAD LINES FOR STEAMERS [2]

§ 43.15–1 *Length (L).* (a) The length used with the rules and freeboard tables is the length in feet on the summer load water line from the foreside of the stem to the afterside of the rudder post. Where there is no rudder post, the length is measured from the foreside of the stem to the axis of the rudder stock. For vessels with cruiser sterns, the length is to be taken as 96 percent of the total length on the designed summer load water line or as the length from the foreside of the stem to the axis of the rudder stock if that be the greater.

§ 43.15–5 *Breadth (B).* (a) The breadth is the maximum breadth in feet amidships to the molded line of the frame in iron or steel vessels and to the outside of the planking in wood or composite vessels.

§ 43.15–7 *Molded depth.* (a) The molded depth is the vertical distance in feet measured amidships, from the top of the keel to the top of the freeboard deck beam at side. In wood and composite vessels the distance is measured from the lower edge of the keel rabbet. Where the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the depth is measured from the point where the line of the flat of the bottom continued inwards cuts the side of the keel.

§ 43.15–10 *Depth for freeboard (D).* (a) The depth used with the freeboard table is the molded depth plus the thickness of stringer plate, or plus

$$\frac{T\ (L-S)}{L} \qquad (1)$$

if that be greater, where

(1) *T* is the mean thickness of the exposed deck clear of deck openings, and

(2) *S* is the total length of superstructures as defined in § 43.15–27.

(b) Where the topsides are of unusual form, *D* is the depth of a midship section having vertical topsides, standard round of beam, and area of topside section equal to that in the actual midship section. Where there is a step or break in the topsides (that is, as in the turret-deck vessel) 70 percent of the area above the step or break is included in the area used to determine the equivalent section.

(c) In a vessel without an inclosed superstructure covering at least 0.6L amidships, without a complete trunk or

[2] The provisions of §§ 43.01–1—43.01–100, inclusive, and §§ 43.05–1—43.10–100, inclusive, apply to all vessels and for steamers, are further supplemented by §§ 43.15–1—43.15–97, inclusive. Steamers taking advantage of special classifications, such as tankers, steamers carrying timber deck cargo, lumber schooners, etc., are also subject to these requirements except as specifically modified in their separate classifications as set forth in the regulations.

without a combination of intact partial superstructures and trunk extending all fore-and-aft, where D is less than $\frac{L}{15}$, the depth used with the table is not to be taken as less than $\frac{L}{15}$.

§ 43.15–15 *Coefficient of fineness (c).* (a) The coefficient of fineness used with the freeboard table is given by

$$c=\frac{35\Delta}{L.B.d_1} \qquad (1)$$

where Δ is the vessel's molded displacement in tons (excluding bossing) at a mean molded draft d_1 which is 85 percent of the molded depth.

(b) The coefficient c is not to be taken as less than 0.68.

§ 43.15–17 *Strength.* (a) The assigning authority is to be satisfied with the structural strength of vessels to which freeboards are assigned.

(b) Vessels which comply with the highest standard of the rules of a classification society recognized by the Commandant, U. S. Coast Guard, shall be regarded as having sufficient strength for the minimum freeboards allowed under the regulations in this part.

(c) Vessels which do not comply with the highest standard of the rules of a classification society recognized by the Commandant, U. S. Coast Guard, shall be assigned such increased freeboards as shall be determined by the assigning authority, and for guidance the following strength moduli are formulated:

(1) *Material.* The strength moduli are based on the assumption that the structure is built of mild steel, manufactured by the open-hearth process (acid or basic), and having a tensile strength of 26 to 32 tons per square inch, and an elongation of at least 16 percent, on a length of 8 inches.

(2) *Strength deck.* The strength deck is the uppermost deck which is incorporated into and forms an integral part of the longitudinal girder within the half-length amidships.

(3) *Depth to strength deck (Ds).* The depth to strength deck is the vertical distance in feet amidships from the top of the keel to the top of the strength deck beam at side.

(4) *Draft (d).* The draft is the vertical distance in feet amidships from the top of the keel to the center of the disk.

(5) *Longitudinal modulus.* The longitudinal modulus $\frac{I}{y}$ is the moment of inertia I of the midship section about the neutral axis divided by the distance y measured from the neutral axis to the top of the strength deck beam at side, calculated in way of openings but without deductions for rivet holes. Areas are measured in square inches and distances in feet.

(i) Below the strength deck, all continuous longitudinal members other than such parts of underdeck girders as are required entirely for supporting purposes are included. Above the strength deck, the gunwale angle bar and the extension of the sheerstrake are the only members included.

(ii) The required longitudinal modulus for effective material is expressed by $f.d.B.$, where f is the factor obtained from Table 43.15–17(c)(5)(ii).

TABLE 43.15–17 (c) (5) (ii)

L	f	L	f	L	f
100	1.80	280	6.20	460	14.15
120	2.00	300	6.95	480	15.15
140	2.35	320	7.70	500	16.25
160	2.70	340	8.55	520	17.35
180	3.15	360	9.40	540	18.45
200	3.60	380	10.30	560	19.60
220	4.20	400	11.20	580	20.80
240	4.80	420	12.15	600	22.00
260	5.45	440	13.10		

(iii) For intermediate lengths, the value of f is determined by interpolation. This formula applies where L does not exceed 600 feet; B is between

$$\frac{L}{10}+5 \text{ and } \frac{L}{10}+20 \qquad (1)$$

both inclusive, and $\frac{L}{D_s}$ is between 10 and 13.5, both inclusive.

(6) *Frame.* For the purpose of the frame modulus, the frame is regarded as composed of a frame angle and a reverse angle each of the same size and thickness.

(7) *Frame modulus.* The modulus $\frac{I}{y}$ of the midship frame below the lowest tier of beams is the moment of inertia I of the frame section about the neutral axis divided by the distance y measured from the neutral axis to the extremity of the frame section, calculated without deduction for rivet and bolt holes. The modulus is measured in inch units.

(i) The required frame modulus is expressed by

$$\frac{s(d-t)\ (f_1+f_2)}{1{,}000} \qquad (2)$$

where:

s is the frame spacing in inches.

t is the vertical distance in feet measured at amidships from the top of the keel to a point midway between the top of the inner bottom at side and the top of the heel bracket (see fig. 43.15–17 (c) (7) (i)); where there is no double bottom, t is measured to a point midway between the top of the floor at center and the top of the floor at side.

f_1 is a coefficient depending on H, which, in vessels fitted with double bottoms, is the vertical distance in feet from the middle of the beam bracket of the lowest tier of beams at side to a point midway between the top of the inner bottom at side and the top of the heel bracket (see fig. 43.15–17 (c) (7) (i)); where there is no double bottom, H is measured to a point midway between the top of the floor at center and the top of the floor at side. Where the frame obtains additional strength from the form of the vessel, due allowance is made in the value of f_1.

f_2 is a coefficient depending on K, which is the vertical distance in feet from the top of the lowest tier of beams at side to a point 7 feet 6 inches above the freeboard deck at side, or, if there is a superstructure, to a point 12 feet 6 inches above the freeboard deck at side. (See fig. 43.15–17 (c) (7) (i).) The values of f_1 *and* f_2 are obtained from Table 43.15–17 (c) (7) (i).

TABLE 43.15–17 (c) (7) (i)

H in feet	0	7	9	11	13	15	17	19	21	23	25
f_1	9	11	12.5	15	19	24	29.5	36	43	51	59
K in feet	0	5	10	15	20	25	30	35	40	.....	.....
f_2	0	0.5	1.0	2.0	3.0	4.5	6.5	9.0	12.0	.....	.....

Intermediate values are obtained by interpolation.

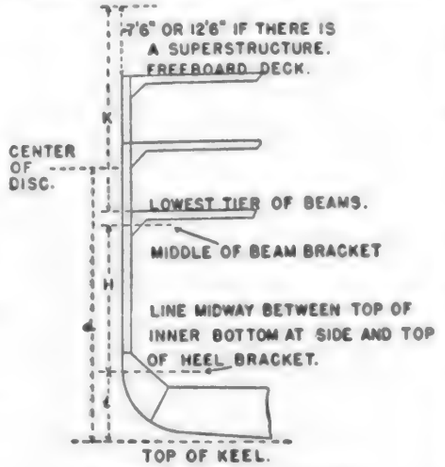

7'6" OR 12'6" IF THERE IS A SUPERSTRUCTURE.
FREEBOARD DECK.
K
CENTER OF DISC.
LOWEST TIER OF BEAMS.
MIDDLE OF BEAM BRACKET
H
LINE MIDWAY BETWEEN TOP OF INNER BOTTOM AT SIDE AND TOP OF HEEL BRACKET.
t
TOP OF KEEL.

FIGURE 43.15–17 (c) (7) (i)

(ii) This formula applies where D is between 15 feet and 60 feet, both inclusive, B is between

$$\frac{L}{10}+5 \text{ and } \frac{L}{10}+20, \text{ both inclusive, } \frac{L}{D_s}$$

is between 10 and 13.5, both inclusive, and the horizontal distance from the outside of the frame to the center of the first row of pillars does not exceed 20 feet.

(iii) In single-deck vessels of ordinary form, where H does not exceed 18 feet, the frame modulus determined by the preceding method is multiplied by the factor f_3 where

$$f_3=0.50+0.05\ (H-8) \qquad (3)$$

(iv) Where the horizontal distance from the outside of the frame to the center of the first row of pillars exceeds 20 feet, the assigning authority is to be satisfied that sufficient additional strength is provided.

§ 43.15–20 *Height of superstructure.* (a) The height of a superstructure is the least vertical height measured from the top of the superstructure deck to the top of the freeboard deck beams minus the difference between D and the molded depth. (See §§ 43.15–7, 43.15–10.)

§ 43.15–25 *Standard height of superstructure.* (a) The standard height of a raised quarter-deck is 3 feet for vessels up to and including 100 feet in length, 4 feet for vessels 250 feet in length, and 6 feet for vessels 400 feet in length and above. The standard height of any

other superstructure is 6 feet for vessels up to and including 250 feet in length and 7 feet 6 inches for vessels 400 feet in length and above. The standard height at intermediate lengths is obtained by interpolation.

§ 43.15–27 *Length of superstructure (S).* (a) The length of a superstructure is the mean covered length of the parts of the superstructure which extends to the sides of the vessel and lie within lines drawn perpendicular to the extremities of the summer load water line, as defined in § 43.15–1.

§ 43.15–30 *Inclosed superstructure.* (a) A detached superstructure is regarded as inclosed only where:

(1) The inclosing bulkheads are of efficient construction. (See § 43.15–35.)

(2) The access openings in these bulkheads are fitted with class 1 or class 2 closing appliances. (See §§ 43.15–37, 43.15–40.)

(3) All other openings in sides or ends of the superstructure are fitted with efficient weather-tight means of closing.

(4) Independent means of access to crew, machinery, bunker, and other working spaces within bridges and poops are at all times available when the bulkhead openings are closed.

§ 43.15–35 *Superstructure bulkheads.* (a) Bulkheads at exposed ends of poops, bridges, and forecastles are deemed to be of efficient construction where the assigning authority is satisfied that, in the circumstances, they are equivalent to the following standard for vessels with minimum freeboards under which standard the stiffeners and plating are of the scantlings given in Table 43.15–35 (a), the stiffeners are spaced 30 inches apart, the stiffeners on poop and bridge front bulkheads have efficient end connections, and those on after bulkheads of bridges and forecastles extend for the whole distance between the margin angles of the bulkheads.

TABLE 43.15–35 (a).—EXPOSED BULKHEADS OF SUPERSTRUCTURES OF STANDARD HEIGHT

Bridge front bulkheads, unprotected bulkheads of poops 0.4*L* or more in length		Bulkheads of poops partially protected or less in length than 0.4*L*		After bulkheads of bridges and forecastles	
Length of vessel	Bulb angle stiffeners	Length of vessel	Plain angle stiffeners	Length of vessel	Plain angle stiffeners
Feet	*Inches*	*Feet*	*Inches*	*Feet*	*Inches*
Under 160	5½ by 3 by 0.30.	Under 150	3 by 2½ by 0.30.	Under 150	2½ by 2½ by 0.26.
160	6 by 3 by 0.32.	150	3½ by 2½ by 0.32.	150	3 by 2½ by 0.28.
200	6½ by 3 by 0.34.	200	4 by 3 by 0.34.	250	3½ by 3 by 0.30.
240	7 by 3 by 0.36.	250	4½ by 3 by 0.36.	350	4 by 3 by 0.32.
280	7½ by 3 by 0.38.	300	5 by 3 by 0.38.		
320	8 by 3 by 0.40.	350	5½ by 3 by 0.42.		
360	8½ by 3 by 0.42.	400	6 by 3 by 0.44.		
400	9 by 3 by 0.44.	450	6½ by 3½ by 0.46.		
440	9½ by 3½ by 0.46.	500	7 by 3½ by 0.48.		
480	10 by 3½ by 0.48.	550	7 by 3½ by 0.50.		
520	10½ by 3½ by 0.50.				
560	11 by 3½ by 0.52.				

Length of vessel	Bulkhead plating [1]	Length of vessel	Bulkhead plating [1]	Length of vessel	Bulkhead plating [1]
Feet	*Inch*	*Feet*	*Inch*	*Feet*	*Inch*
200 and under	0.3	160 and under	0.24	160 and under	0.20
380 and above	.44	400 and above	.38	400 and above	.30

[1] For vessels intermediate in length the thicknesses of bulkhead plating are obtained by interpolation.

§ 43.15–37 *Class 1 closing appliances.* (a) These appliances are of iron or steel, are in all cases to be permanently and strongly attached to the bulkhead, are framed, stiffened, and fitted so that the whole structure is of equivalent strength to the unpierced bulkhead, and are weathertight when closed. The means for securing these appliances are permanently attached to the bulkhead or to the appliances, and the latter are so arranged that they can be closed and secured from both sides of the bulkhead or from the deck above. The sills of the access openings are at least 15 inches above the deck.

§ 43.15–40 *Class 2 closing appliances.* (a) These appliances are (1) strongly framed hardwood hinged doors, which are not more than 30 inches wide nor less than 2 inches thick, or (2) shifting boards fitted for the full height of the opening in channels riveted to the bulkhead, the shifting boards being at least 2 inches thick where the width of opening is 30 inches or less, and increased in thickness at the rate of 1 inch for each additional 15 inches of width, or (3) portable plates of equal efficiency.

§ 43.15–43 *Temporary closing appliances.* (a) Temporary closing appliances for middle line openings in the deck of an inclosed superstructure consist of

(1) A steel coaming not less than 9 inches in height efficiently riveted to the deck;

(2) Hatchway covers as required by § 43.10–15, secured by hemp lashings; and

(3) Hatchway supports as required by §§ 43.10–20, 43.10–25 and by Table 43.05–20 (a1) or 43.05–20 (a2).

§ 43.15–45 *General, relative superstructures.* (a) Where exposed bulkheads of the ends of poops, bridges, and forecastles are not of efficient construction (see § 43.10–25), they are considered as nonexistent.

(b) Where in the side plating of a superstructure there is an opening not provided with permanent means of closing, the part of the superstructure in way of the opening is regarded as having no effective length.

(c) Where the height of a superstructure is less than the standard, its length is reduced in the ratio of the actual to the standard height. Where the height exceeds the standard, no increase is made in the length of the superstructure.

§ 43.15–47 *Poop.* (a) Where there is an efficient bulkhead and the access openings are fitted with class 1 closing appliances (§ 43.15–37), the length to the bulkhead is effective. Where the access openings in an efficient bulkhead are fitted with class 2 closing appliances (§ 43.15–40) and the length to the bulkhead is 0.5*L* or less, 100 percent of that length is effective; where the length is 0.7*L* or more, 90 percent of that length is effective; where the length is between 0.5*L* *and* 0.7*L*, an intermediate percentage of that length is effective; where an allowance is given for an efficient adjacent trunk (see § 43.15–57), 90 percent of the length to the bulkhead is to be taken as effective; 50 percent of the length of an open poop or of an open extension beyond an efficient bulkhead is effective.

§ 43.15–50 *Raised quarter-deck.* (a) Where there is an efficient intact bulkhead, the length to the bulkhead is effective. Where the bulkhead is not intact, the superstructure is considered as a poop of less than standard height.

§ 43.15–53 *Bridge.* (a) Where there is an efficient bulkhead at each end, and the access openings in the bulkhead are fitted with class 1 closing appliances, the length between the bulkheads is effective.

(b) Where the access openings in the forward bulkhead are fitted with class 1 closing appliances and the access openings in the after bulkhead with class 2 closing appliances, the length between the bulkheads is effective; where an allowance is given for an efficient trunk, adjacent to the after bulkhead (see § 43.15–57), 90 percent of the length is effective. Where the access openings in both bulkheads are fitted with class 2 closing appliances, 90 percent of the length between the bulkheads is effective. Where the access openings in the forward bulkhead are fitted with class 1 or class 2 closing appliances and the access openings in the after bulkhead have no closing appliances, 75 percent of the length between the bulkheads is effective. Where the access openings in both bulkheads have no closing appliances, 50 percent of the length is effective; 75 percent of the length of an open extension beyond the after bulkhead and 50 percent of that beyond the forward bulkhead are effective.

CROSS REFERENCE: For class 1 and class 2 closing appliances, see §§ 43.15–37, 43.15–40.

§ 43.15–55 *Forecastle.* (a) Where there is an efficient bulkhead and the access openings are fitted with class 1 or class 2 closing appliances, the length to the bulkhead is effective. Where no closing appliances are fitted and the sheer forward of amidships is not less

than the standard sheer, 100 percent of the length of the forecastle forward of $0.1L$ from the forward perpendicular is effective; where the sheer forward is half the standard sheer or less, 50 percent of that length is effective; and where the sheer forward is intermediate between the standard and half the standard sheer, an intermediate percentage of that length is effective; 50 percent of the length of an open extension beyond the bulkhead or beyond $0.1L$ from the forward perpendicular is effective.

CROSS REFERENCE: For class 1 and class 2 closing appliances, see §§ 43.15–37, 43.15–40.

§ 43.15–57 *Trunk.* (a) A trunk or similar structure which does not extend to the sides of the vessel is regarded as efficient: *Provided,* That,

(1) The trunk is at least as strong as a superstructure.

(2) The hatchways are in the trunk deck, and comply with the requirements of §§ 43.10–1—43.10–45 and the width of the trunk deck stringer provides a satisfactory gangway and sufficient lateral stiffness.

(3) A permanent working platform fore and aft fitted with guard rails is provided by the trunk deck, or by detached trunks connected to other superstructures by efficient permanent gangways.

(4) Ventilators are protected by the trunk, by watertight covers or by equivalent means.

(5) Open rails are fitted on the weather portions of the freeboard deck in way of the trunk for at least half their length.

(6) The machinery casings are protected by the trunk, by a superstructure of standard height, or by a deck house of the same height and of equivalent strength.

(b) Where access openings in poop and bridge bulkheads are fitted with class 1 closing appliances, 100 percent of the length of an efficient trunk reduced in the ratio of its mean breadth to B is added to the effective length of the superstructures. Where the access openings in these bulkheads are not fitted with class 1 closing appliances 90 percent is added.

(c) The standard height of a trunk is the standard height of a bridge.

(d) Where the height of the trunk is less than the standard height of a bridge, the addition is reduced in the ratio of the actual to the standard height; where the height of hatchway coamings on the trunk deck is less than the standard height of coamings (see § 43.10–10), a reduction from the actual height of trunk is to be made which corresponds to the difference between the actual and the standard height of coamings.

§ 43.15–60 *Inclosed superstructure with middle line openings in the deck not provided with permanent means of closing.* (a) Where there is an inclosed superstructure with one or more middle line openings in the deck not provided with permanent means of closing (see §§ 43.10–1—43.10–45), the effective length of the superstructure is determined as follows:

(1) Where efficient temporary closing appliances are not provided for the middle line deck openings (see § 43.15–43), or the breadth of openings is 80 percent or more of the breadth B_1 of the superstructure deck at the middle of the opening, the vessel is considered as having an open well in way of each opening, and freeing ports are to be provided in way of this well. The effective length of superstructure between openings is governed by §§ 43.15–47, 43.15–53, 43.15–55.

(2) Where efficient temporary closing appliances are provided for middle line deck openings, and the breadth of openings is less than $0.8B_1$ the effective length is governed by §§ 43.15–47, 43.15–53, 43.15–55, except that where access openings in between deck bulkheads are closed by class 2 closing appliances, they are regarded as being closed by class 1 closing appliances in determining the effective length. The total effective length is obtained by adding to the length determined by subparagraph (1) of this paragraph the difference between this length and the length of the vessel modified in the ratio of

$$\frac{B_1-b}{B_1} \text{ where } b=\text{breadth of deck opening}$$

where

$$\frac{B_1-b}{B_1} \text{ is greater than 0.5, it is taken as 0.5}$$

§ 43.15–63 *Deductions for superstructures.* (a) Where the effective length of superstructures is $1.0L$, the deduction from the freeboard is 14 inches at 80 feet length, 34 inches at 280 feet length, and 42 inches at 400 feet length and above; deductions at intermediate lengths are obtained by interpolation. Where the total effective length of superstructures is less than $1.0L$ the deduction is a percentage obtained from Table 43.15–63:

TABLE 43.15–63 (a).—TOTAL EFFECTIVE LENGTH OF SUPERSTRUCTURE (E)

Superstructures	0	$0.1L$	$0.2L$	$0.3L$	$0.4L$	$0.5L$	$0.6L$	$0.7L$	$0.8L$	$0.9L$	$1.0L$	Line
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
All types with forecastle and without detached bridge	0	5	10	15	23.5	32	46	63	75.3	87.7	100	A
All types with forecastle and detached bridge [1]	0	6.3	12.7	19	27.5	36	46	63	75.3	87.7	100	B

[1] Where the effective length of a detached bridge is less than $0.2L$ the percentages are obtained by interpolation between lines B and A. Where no forecastle is fitted the above percentages are reduced by 5. Percentages for intermediate lengths of superstructures are obtained by interpolation.

§ 43.15–65 *Sheer, general.* (a) The sheer is measured from the deck at side to a line of reference drawn parallel to the keel through the sheer line at amidships.

(b) In vessels designed to trim by the stern in service, the sheer may be measured in relation to the load line, provided an additional mark is placed at $0.25\ L$ forward of amidships to indicate the assigned load line. This mark is to be similar to the load line disk amidships.

(c) In flush deck vessels and in vessels with detached superstructures the sheer is measured at the freeboard deck.

(d) In vessels with topsides of unusual form in which there is a step or break in the topsides, the sheer is considered in relation to the equivalent depth amidships. (See § 43.15–15.)

(e) In vessels with a superstructure of standard height which extends over the whole length of the freeboard deck, the sheer is measured at the superstructure deck; where the height exceeds the standard, the sheer may be considered in relation to the standard height.

(f) Where a superstructure is intact or access openings in its inclosing bulkheads are fitted with class 1 closing appliances (§ 43.15–37), and the superstructure deck has at least the same sheer as the exposed freeboard deck, the sheer of the inclosed portion of the freeboard deck is not taken into account.

§ 43.15–67 *Standard sheer profile.* (a) The ordinates (in inches) of the standard sheer profile are given in Table 43.15–67, where L is the number of feet in the length of the vessel.

TABLE 43.15–67 (a)

Station	Ordinate	Factor
A. P.[1]	$0.1\ L+10$	1
1/6 L from A. P.	$.0445L+4.45$	4
1/3 L from A. P.	$.011\ L+1.1$	2
Amidships	0	4
1/3 L from F. P.[2]	$.022\ L+2.2$	1
1/6 L from F. P.	$.089\ L+8.9$	4
F. P.	$.2\ L+20$	1

[1] A. P. = After end of summer load water line.
[2] F. P. = Fore end of summer load water line.

§ 43.15–70 *Measurement of variations from standard sheer profile.* (a) Where the sheer profile differs from the standard, the 7 ordinates of each profile are multiplied by the appropriate factors given in the table of ordinates. The difference between the sums of the respective products, divided by 18, measures the deficiency or excess of sheer. Where the after half of the sheer profile is greater than the standard and the forward half is less than the standard, no credit is allowed for the part in excess and the deficiency only is measured.

(b) Where the forward half of the sheer profile exceeds the standard, and the after portion of the sheer profile is not less than 75 percent of the standard, credit is allowed for the part in excess; where the after part is less than 50 percent of the standard no credit is given for the excess sheer forward. Where the after sheer is between 50 percent and 75 percent of the standard, intermediate allowances may be granted for excess sheer forward.

§ 43.15–73 *Correction for variations from standard sheer profile.* (a) The

correction for sheer is the deficiency or excess of sheer (see § 43.15–70 (a)) multiplied by $0.75-\frac{S}{2L}$ where S is the total length of superstructure, as defined in § 43.15–27.

§ 43.15–75 *Addition for deficiency in sheer.* Where the sheer is less than the standard, the correction for deficiency in sheer (see § 43.15–73) is added to the freeboard.

§ 43.15–77 *Deduction for excess sheer.* (a) In flush deck vessels and in vessels where an inclosed superstructure covers 0.1 *L* before and 0.1 *L* abaft amidships, the correction for excess of sheer (see § 43.15–73) is deducted from the freeboard; in vessels with detached superstructures where no inclosed superstructure covers amidships, no deduction is made from the freeboard; where an inclosed superstructure covers less than 0.1 *L* before and 0.1 *L* abaft amidships, the deduction is obtained by interpolation. The maximum deduction for excess sheer is 1½ inches at 100 feet and increases at the rate of 1½ inches for each additional 100 feet in the length of the vessel.

§ 43.15–80 *Standard round of beam.* (a) The standard round of beam of the freeboard deck is one-fiftieth of the breadth of the vessel.

§ 43.15–83 *Round of beam correction.* (a) Where the round of beam of the freeboard deck is greater or less than the standard, the freeboard is decreased or increased respectively by one-fourth of the difference between the actual and the standard round of beam, multiplied by the proportion of the length of the freeboard deck not covered by inclosed superstructures. Twice the standard round of beam is the maximum for which allowance is given.

§ 43.15–85 *Summer freeboard.* (a) The minimum freeboard in summer is the freeboard derived from the freeboard table after corrections for departures from the standards and after deduction for superstructures. The freeboard in salt water measured from the intersection of the upper surface of the freeboard deck with the outer surface of the shell is not to be less than 2 inches.

§ 43.15–87 *Tropical freeboard.* (a) The minimum freeboard in the tropical zone is the freeboard obtained by a deduction from the summer freeboard of one-fourth inch per foot of summer draft measured from the top of the keel to the center of the disk. The freeboard in salt water measured from the intersection of the upper surface of the freeboard deck with the outer surface of the shell is not to be less than 2 inches.

§ 43.15–90 *Winter freeboard.* (a) The minimum freeboard in winter is the freeboard obtained by an addition to the summer freeboard of one-fourth inch per foot of summer draft, measured from the top of the keel to the center of the disk.

§ 43.15–93 *Winter North Atlantic freeboard.* (a) The minimum freeboard for vessels not exceeding 330 feet in length on voyages across the North Atlantic from a port or place of departure north of latitude 36° N. to a port or place of arrival north of latitude 36° N., regardless of the route of the vessel while it is in either of the northern seasonal winter zones during the winter season, shall be the winter freeboard plus 2 inches. For vessels over 330 feet in length it is the winter freeboard.

§ 43.15–95 *Fresh-water freeboard.* (a) The minimum freeboard in fresh water of unit density is the freeboard obtained by deducting from the minimum freeboard in salt water $\frac{\Delta}{40T}$ inches, where

Δ=displacement in salt water in tons at the summer load water line, and T=tons per inch immersion in salt water at the summer load water line.

(b) Where the displacement at the summer load water line cannot be certified, the deduction is to be one-fourth inch per foot of summer draft, measured from the top of the keel to the center of the disk.

§ 43.15–97 *Freeboard table for steamers.* (a) Table 43.15–97 (a) gives the basic minimum summer freeboard for steamers which comply with the standards in this part.

TABLE 43.15–97 (a).—BASIC MINIMUM SUMMER FREEBOARD FOR STEAMERS

L	Freeboard	*L*	Freeboard	*L*	Freeboard
Feet	*Inches*	*Feet*	*Inches*	*Feet*	*Inches*
80	8.0	310	45.9	540	113.7
90	9.0	320	48.4	550	116.4
100	10.0	330	51.0	560	119.1
110	11.0	340	53.7	570	121.8
120	12.0	350	56.5	580	124.4
130	13.0	360	59.4	590	127.0
140	14.2	370	62.4	600	129.5
150	15.5	380	65.4	610	132.0
160	16.9	390	68.4	620	134.4
170	18.3	400	71.5	630	136.8
180	19.8	410	74.6	640	139.1
190	21.4	420	77.8	650	141.4
200	23.1	430	80.9	660	143.7
210	24.8	440	84.0	670	145.9
220	26.6	450	87.1	680	148.1
230	28.5	460	90.2	690	150.2
240	30.3	470	93.3	700	152.3
250	32.3	480	96.3	710	154.4
260	34.4	490	99.3	720	156.4
270	36.5	500	102.3	730	158.5
280	38.7	510	105.2	740	160.5
290	41.0	520	108.1	750	162.5
300	43.4	530	110.9		

(b) The minimum freeboards for flush deck steamers are obtained by an addition to Table 43.15–97 (a) at the rate of 1½ inches for every 100 feet of length.

(c) The freeboards at intermediate lengths are obtained by interpolation.

(d) Where *c* exceeds 0.68, the freeboard is multiplied by the factor

$$\frac{c+0.68}{1.36} \quad (1)$$

(e) Where *D* exceeds $\frac{L}{15}$ the freeboard is increased by $\left(D-\frac{L}{15}\right)R$ inches, where *R* is $\frac{L}{130}$ at lengths less than 390 feet, and 3 at 390 feet length and above.

(1) In a vessel with an inclosed superstructure covering at least 0.6*L* amidships with a complete trunk or with a combination of intact partial superstructures and trunk which extends all fore and aft, where *D* is less than $\frac{L}{15}$ the freeboard is reduced at the above rate.

(2) Where the height of superstructures or trunk is less than the standard height, the reduction is in the ratio of the actual to the standard height.

(f) Where the actual depth to the surface of the freeboard deck amidships is greater or less than *D*, the difference between the depths (in inches) is added to or deducted from the freeboard.

SUBPART 43.20—LOAD LINES FOR SAILING VESSELS [4]

§ 43.20–1 *Lines to be used on sailing vessels in connection with the disk.* (a) Winter and tropical load lines are not marked on sailing vessels. The maximum load lines to which sailing vessels may be laden in salt water in winter and in the tropical zone is the center of the disk. (See fig. 43.20–1 (a).)

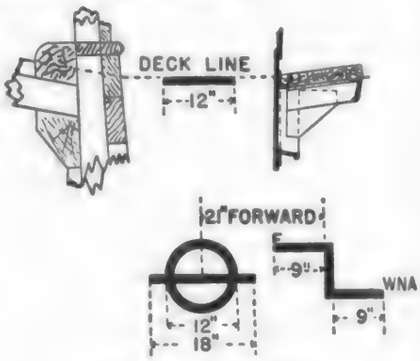


FIGURE 43.20–1 (a)

§ 43.20–5 *Conditions of assignment of sailing vessel load lines.* (a) The conditions of assignment for sailing vessels are those contained in §§ 43.10–1—43.10–100.

§ 43.20–10 *Computation of freeboard, sailing vessels.* (a) Freeboards are computed from the freeboard table for sailing vessels in the same manner as the freeboards for steamers are computed from the freeboard table for steamers, except as provided by §§ 43.20–15—43.20–45.

§ 43.20–15 *Depth for freeboard, sailing vessels (D).* (a) In sailing vessels having a greater rate of rise of floor than 1½ inches per foot, the vertical distance from the top of keel (§ 43.15–7) is reduced by half the difference between the total rise of floor at the half breadth of the vessel and the total rise of 1½ inches per foot; 2½ inches per foot of half breadth is the maximum rate of rise for which a deduction is made.

(b) Where the form at the lower part of the midship section is of a hollow character, or thick garboards are fitted, the depth is measured from the point where the line of the flat of the bottom continued inwards cuts the side of the keel.

[4] The provisions of §§ 43.01–1—43.01–100 and 43.05–1—43.15–97, inclusive, apply to sailing vessels, except as modified by §§ 43.20–1—43.20–45, inclusive.

(c) The depth used with the freeboard table is to be taken as not less than $\frac{L}{12}$.

§ 43.20–20 *Coefficient of fineness, sailing vessels (c).* (a) The coefficient used with the freeboard table for sailing vessels is to be taken as not less than 0.62 and not greater than 0.72.

§ 43.20–25 *Superstructures in wood sailing vessels.* (a) In wood sailing vessels the construction and closing arrangements of superstructures for which deductions are made from the freeboard are to be to the satisfaction of the assigning authority.

§ 43.20–30 *Deductions for sailing vessel superstructures.* (a) Where the effective length of superstructures on sailing vessels is 1.0*L*, the deduction from the freeboard is 3 inches at 80 feet length of vessel, and 28 inches at 330 feet length and above; deductions in intermediate lengths are obtained by interpolation. Where the total effective length of superstructures is less than 1.0*L*, the deduction is a percentage obtained from Table 43.20–30 (a).

TABLE 43.20-30 (a).—TOTAL EFFECTIVE LENGTH OF SUPERSTRUCTURES (E)

Type of superstructures	0	0.1*L*	0.2*L*	0.3*L*	0.4*L*	0.5*L*	0.6*L*	0.7*L*	0.8*L*	0.9*L*	1.0*L*	Line
	Per-cent	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	
All types without bridge	0	7	13	17	23.5	30	47½	70	80	90	100	A
All types with bridge [1]	0	7	14.7	22	32	42	56	70	80	90	100	B

[1] Where the effective length of bridge is less than 0.2*L*, the percentages are obtained by interpolation between lines B and A. Percentages for intermediate lengths of superstructures are obtained by interpolation.

§ 43.20–35 *Minimum freeboards for sailing vessels.* (a) No addition to the freeboard is required for winter freeboard, nor is a deduction permitted for tropical freeboard.

(b) An increase in freeboard of 3 inches is made for voyages across the North Atlantic north of latitude 36° N. during the winter months.

(c) In computing the fresh water freeboard for a wood vessel, the draft is measured from the lower edge of the rabbet of keel to the center of the disk.

§ 43.20–40 *Freeboard table for sailing vessels.* (a) Table 43.20–40 (a) gives the basic minimum summer, winter, and tropical freeboards for iron and steel flush deck sailing vessels, which comply with the standards in this part.

TABLE 43.20–40 (a).—MINIMUM SUMMER, WINTER, AND TROPICAL FREEBOARDS FOR IRON AND STEEL FLUSH DECK SAILING VESSELS

L (feet)	Freeboard	*L* (feet)	Freeboard	*L* (feet)	Freeboard
	Inches		*Inches*		*Inches*
80	9.2	170	28.2	260	50.8
90	11.0	180	30.6	270	53.5
100	12.9	190	33.0	280	56.3
110	14.9	200	35.4	290	59.1
120	17.0	210	37.9	300	61.9
130	19.1	220	40.4	310	64.7
140	21.3	230	42.9	320	67.6
150	23.5	240	45.5	330	70.5
160	25.8	250	48.1		

(b) The freeboards at intermediate lengths are obtained by interpolation.

(c) Where *c* exceeds 0.62 the freeboard is multiplied by the factor

$$\frac{c+.62}{1.24} \quad (1)$$

(d) Where *D* exceeds $\frac{L}{12}$ the freeboard is increased by

$$\left(D-\frac{L}{12}\right)\times\left(1+\frac{L}{250}\right) \text{ inches.} \quad (2)$$

(e) Where the actual depth to the surface of the freeboard deck amidships is greater or less than *D*, the difference between the depths (in inches) is added to or deducted from the freeboard.

§ 43.20–45 *Freeboard for wood sailing vessels.* (a) The freeboard for a wood sailing vessel is the final freeboard the vessel would obtain if she were of iron or steel, with the addition of such penalties as the assigning authority may determine, having regard to the classification, construction, age, and condition of the vessel.

SUBPART 43.25—LOAD LINES FOR STEAMERS CARRYING TIMBER DECK CARGOES [5]

§ 43.25–1 *Definitions—(a) Timber deck cargo.* The term "timber deck cargo" means a cargo of timber carried on an uncovered part of a freeboard or superstructure deck. The term does not include wood pulp or similar cargo.

(b) *Timber load line.* A timber load line is a special load line to be used only when the vessel is carrying a timber deck cargo in compliance with the requirements in this subpart.

§ 43.25–5 *Marks on the vessel's sides; timber cargo; timber load lines.* (a) The lines which indicate the maximum timber load lines in different circumstances and at different seasons are to be horizontal lines, 9 inches in length and 1 inch in breath, which extend from, and are at right angles to, a vertical line marked 21 inches abaft the center of the disk. (See fig. 43.25–5 (a).) They are to be marked and verified similarly to the ordinary load lines. (See §§ 43.05–20—43.05–30.)

(b) The summer timber load line is indicated by the upper edge of a line marked *"LS."*

(c) The winter timber load line is indicated by the upper edge of a line marked *"LW."*

(d) The winter North Atlantic timber load line is indicated by the upper edge of a line marked *"LWNA."*

(e) The tropical timber load line is indicated by the upper edge of a line marked *"LT."*

(f) The fresh water timber load line in summer is indicated by the upper edge of a line marked *"LF."* The difference between the fresh water timber load line in summer and the summer timber load line is the allowance to be made for loading in fresh water at the other timber load lines. The fresh water timber load line in the tropical zone is indicated by the upper edge of a line marked "LTF." [6]

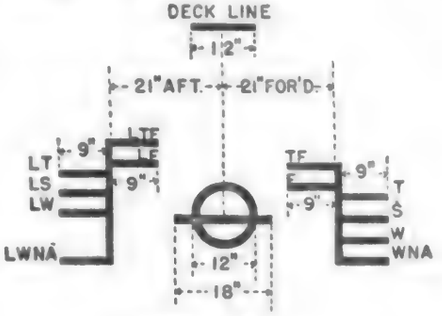


FIGURE 43.25–5 (a)

§ 43.25–10 *Construction of vessel; timber cargo.* (a) The structure of the vessel is to be of sufficient strength for the deeper draft allowed and for the weight of the deck cargo.

§ 43.25–15 *Superstructures; timber cargo.* (a) The vessel is to have a forecastle of at least standard height and at least 7 percent of the length of the vessel, and, in addition, a poop, or a raised quarter deck with a strong steel hood or deck house fitted aft.

§ 43.25–20 *Machinery casings; timber cargo.* (a) Machinery casings on the freeboard deck are to be protected by a superstructure of at least standard height, unless the machinery casings are of sufficient strength and height to permit of the carriage of timber alongside.

§ 43.25–25 *Double bottom tanks; timber cargo.* (a) Double bottom tanks where fitted within the midship half length of the vessel are to have adequate longitudinal subdivision.

§ 43.25–30 *Bulwarks; timber cargo.* (a) The vessel must be fitted either with permanent bulwarks at least 3 feet 3 inches high, specially stiffened on the upper edge and supported by strong bulwark stays attached to the deck in the way of the beams and provided with necessary freeing ports or with efficient rails of the same height as the above and of specially strong construction.

§ 43.25–35 *Deck openings covered by timber deck cargo.* (a) Openings to spaces below the freeboard deck are to be securely closed and battened down. All fittings, such as hatchway beams fore-and-afters, and covers are to be in place. Where hold ventilation is needed, the ventilators are to be efficiently protected.

§ 43.25–40 *Stowage; timber cargo.* (a) The wells on the freeboard deck are to be filled with timber stowed as solidly as possible, to at least the standard height of a bridge.

[5] The provisions of §§ 43.01–1—43.01–100, inclusive, and §§ 43.05–1—43.15–97, inclusive, also apply to steamers marked to carry timber deck cargoes except as they are modified by §§ 43.25–1—43.30–5, inclusive.

[6] Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

(b) On a vessel within a seasonal winter zone in winter, the height of the deck cargo above the freeboard deck is not to exceed one-third of the extreme breadth of the vessel.

(c) All timber deck cargo is to be compactly stowed, lashed, and secured. It must not interfere in any way with the navigation and necessary work of the vessel, or with the provision of a safe margin of stability at all stages of the voyage, regard being given to additions of weight, such as those due to absorption of water and to losses of weight such as those due to consumption of fuel and stores.

§ 43.25–45 *Protection of crew, access to machinery space; timber cargo.* (a) Safe and satisfactory, access to the quarters of the crew, to the machinery space, and to all other parts used in the necessary work of the vessel is to be available at all times. Deck cargo in way of openings which give access to such parts is to be so stowed that the openings can be properly closed and secured against the admission of water. Efficient protection for the crew in the form of guard rails, or life lines, spaced not more than 12 inches apart vertically, is to be provided on each side of the deck cargo to a height of at least 4 feet above the cargo. The cargo is to be made sufficiently level for gangway purposes.

§ 43.25–50 *Steering arrangements; timber cargo.* (a) Steering arrangements are to be effectively protected from damage by cargo and, as far as practicable, are to be accessible. Efficient provision is to be made for steering in the event of a breakdown in the main steering arrangements.

§ 43.25–55 *Uprights; timber cargo.* (a) Uprights, when required by the nature of the timber, are to be of adequate strength and may be of wood or metal, the spacing is to be suitable for the length and character of timber carried, but is not to exceed 10 feet. Strong angles or metal sockets efficiently secured to the stringer plate or equally efficient means are to be provided for securing the uprights.

§ 43.25–60 *Lashings; timber cargo.* (a) Timber deck cargo is to be efficiently secured throughout its length by independent overall lashings spaced not more than 10 feet apart.

(b) Eye plates for these lashings are to be riveted to the sheer strake at intervals of not more than 10 feet, the distance from an end bulkhead of a superstructure to the first eye plate being not more than 6 feet 6 inches. Additional eye plates may be fitted on the stringer plate.

(c) Overall lashings are to be in good condition and are to be not less than three-fourths inch close link chain or flexibile wire rope of equivalent strength, fitted with sliphooks and stretching screws, which are to be accessible at all times. Wire rope lashings are to have a short length of long link chain to permit the length of lashings to be regulated.

(d) When timber is in lengths less than 12 feet, the spacing of the lashings is to be reduced to suit the length of timber or other suitable provision made.

(e) When the spacing of the lashings is 5 feet or less, the size of the lashing may be reduced, but not less than one-half inch chain or equivalent wire rope is to be used.

(f) All fittings required for securing the lashings are to be of strength corresponding to the strength of the lashings.

(g) On superstructure decks, uprights, where fitted, are to be about 10 feet apart and are to be secured by athwartship lashings of ample strength.

§ 43.25–65 *Plans; timber cargo.* (a) Plans showing the fittings and arrangements for stowing and securing timber deck cargoes in compliance with the foregoing conditions and §§ 43.77a–43.89 are to be submitted to the assigning authority.

§ 43.25–70 *Computation of freeboard; timber cargo.* (a) Where the assigning authority is satisfied that the vessel is suitable and that the conditions and arrangements are at least equal to the foregoing requirements for the carriage of timber deck cargo, the summer freeboards computed in accordance with the rules and tables in §§ 43.15–1—43.15–97, may be modified to give special timber freeboards by substituting the following percentages for those in § 43.15–63:

TABLE 43.25–70 (a).—TOTAL EFFECTIVE LENGTH OF SUPERSTRUCTURES

	0	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	1.0L
All types	Percent 20	Percent 30.75	Percent 41.5	Percent 52.25	Percent 63	Percent 69.25	Percent 75.5	Percent 81.5	Percent 87.5	Percent 93.75	Percent 100

(b) The winter timber freeboard is to be obtained by adding to the summer timber freeboard one-third of an inch per foot of the molded summer timber draft.

(c) The winter North Atlantic timber freeboards are the winter North Atlantic freeboards prescribed in § 43.15–93.

(d) The tropical timber freeboard is to be obtained by deducting from the summer timber freeboard one-quarter of an inch per foot of the molded summer timber draft.

CROSS REFERENCE: For requirements for the carriage of timber deck cargo, see §§ 43.25–1—43.25–65.

SUBPART 43.30—LOAD LINES FOR TANKERS[1]

NOTE: The term "tanker" includes all steamers specially constructed for the carriage of liquid cargoes in bulk.

§ 43.30–1 *Marks on the vessel's sides; tanker.* (a) The marks on the vessel's sides are to be as provided in the figure in § 43.05–15.

§ 43.30–5 *Construction of tanker.* (a) The structure of the vessel is to be of sufficient strength for the increased draft corresponding to the freeboard assigned.

§ 43.30–10 *Forecastle; tanker.* (a) The vessel is to have a forecastle of which the length is not less than 7 percent of the length of the vessel and the height is not less than the standard height.

§ 43.30–15 *Machinery casings; tanker.* (a) The openings in machinery casings on the freeboard deck are to be fitted with steel doors. The casings are to be protected by an inclosed poop or bridge of at least standard height, or by a deck house of equal height and of equivalent strength. The bulkheads at the ends of these structures are to be of the scantlings required for bridge front bulkheads. All entrances to the structures from the freeboard deck are to be fitted with effective closing appliances and the sills are to be at least 18 inches above the deck. Exposed machinery casings on the superstructure deck are to be of substantial construction, and all openings in them are to be fitted with steel closing appliances permanently attached to the casings and capable of being closed and secured from both sides; the sills of such openings are to be at least 15 inches above the deck. Fiddley openings are to be as high above the superstructure deck as is reasonable and practicable and are to have strong steel covers permanently attached in their proper positions.

§ 43.30–20 *Gangway; tanker.* (a) An efficiently constructed permanent gangway of sufficient strength for its exposed position is to be fitted fore and aft at the level of the superstructure deck between the poop and midship bridge, and when crew are berthed forward, from the bridge to the forecastle, or other equivalent means of access may be provided to carry out the purpose of the gangway, such as passages below deck.

§ 43.30–25 *Protection of crew access to machinery space; tanker.* (a) Safe and satisfactory access from the gangway level to the quarters of the crew, the machinery space, and all other parts used in the necessary work of the vessel is to be available at all times. This section does not apply to pump rooms entered from the freeboard deck, when fitted with class 1 closing appliances.

CROSS REFERENCE: For class 1 closing appliances, see § 43.15–37.

§ 43.30–30 *Hatchways; tanker.* (a) All exposed hatchways on the freeboard deck and on the deck of expansion trunks are to be closed watertight by efficient steel covers. Hatchways on the freeboard deck within a forecastle which is closed at the after end with a bulkhead and closing appliances no less effective than Class 2 may be fitted with wood covers, coamings, and closing appliances in accordance with § 43.05–55, provided hatchways on the forecastle deck are closed watertight by efficient steel covers.

[1] The provisions of §§ 43.01–1—43.01–100, inclusive, and §§ 43.05–1—43.15–97, inclusive, also apply to tankers except as they are modified by §§ 43.30–1—43.30–70, inclusive.

§ 43.30–35 *Ventilators; tanker.* (a) Ventilators to spaces below the freeboard deck are to be of ample strength or are to be protected by superstructures or equally efficient means.

§ 43.30–40 *Freeing arrangements; tanker.* (a) Vessels with bulwarks are to have open rails fitted for at least half the length of the exposed portion of the weather deck or other effective freeing arrangements. The upper edge of the sheer strake is to be kept as low as practicable and preferably not higher than the upper edge of the gunwale bar.

(b) Where superstructures are connected by trunks, open rails are to be fitted for the whole length of the weather portions of the freeboard deck.

§ 43.30–45 *Plans; tanker.* (a) Plans showing proposed fittings and arrangements are to be submitted to the assigning authority for approval.

§ 43.30–50 *Computation of freeboard; tanker.* (a) When the assigning authority is satisfied that the foreging requirements are fulfilled, the summer freeboard may be computed from the table for tankers; all corrections except those for flush-deck steamers, detached superstructures, excess sheer, and winter voyages across the North Atlantic are to be made in accordance with §§ 43.15–1—43.15–97.

§ 43.30–55 *Deductions for detached superstructures; tankers.* (a) When the total effective length of superstructure is less than 1.0*L*, the deduction is a percentage of that for a superstructure of length 1.0*L*, and is obtained from Table 43.30–55 (a).

TABLE 43.30–55 (a).—TOTAL EFFECTIVE LENGTH OF SUPERSTRUCTURES

	0	0.1*L*	0.2*L*	0.3*L*	0.4*L*	0.5*L*	0.6*L*	0.7*L*	0.8*L*	0.9*L*	1.0*L*
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
All types	0	7	14	21	31	41	52	63	75.3	87.7	100

§ 43.30–60 *Deduction for excess sheer; tanker.* (a) Where the sheer is greater than the standard, the correction for excess sheer (see § 43.15–73) is deducted from the freeboard for all tankers. Section 43.15–77 does not apply except that the maximum deduction for excess sheer is 1½ inches at 100 feet and increases at the rate of 1½ inches for each additional 100 feet in the length of the vessel.

§ 43.30–65 *Winter North Atlantic freeboard; tanker.* (a) The minimum freeboard for tankers on voyages across the North Atlantic from a port or place of departure north of latitude 36° N. to a port or place of arrival north of latitude 36° N., regardless of the route of the vessel while it is in either of the northern seasonal winter zones during the winter season, shall be the winter freeboard plus an addition at a rate of one inch per 100 feet in length.

§ 43.30–70 *Freeboard table for tankers.* (a) Table 43.30–70 (a) gives the basic minimum summer freeboard for tankers which comply with the standards in this part.

TABLE 43.30–70 (a)—BASIC MINIMUM SUMMER FREEBOARD FOR TANKERS

L (feet)	Freeboard	*L* (feet)	Freeboard	*L* (feet)	Freeboard
	Inches		*Inches*		*Inches*
190	21.5	390	60.2	590	106.5
200	23.1	400	62.5	600	108.4
210	24.7	410	64.9	610	110.3
220	26.3	420	67.4	620	112.2
230	28.0	430	69.9	630	114.0
240	29.7	440	72.5	640	115.8
250	31.5	450	75.1	650	117.6
260	33.3	460	77.7	660	119.3
270	35.2	470	80.2	670	121.0
280	37.1	480	82.7	680	122.6
290	39.1	490	85.1	690	124.2
300	41.1	500	87.5	700	125.8
310	43.1	510	89.8	710	127.3
320	45.1	520	92.1	720	128.8
330	47.1	530	94.3	730	130.3
340	49.2	540	96.5	740	131.8
350	51.3	550	98.6	750	133.2
360	53.5	560	100.7	(1)	------
370	55.7	570	102.7		
380	57.9	580	104.6		

[1] Vessels above 750 feet are to be dealt with by the administration.

SUBPART 43.35—LUMBER SCHOONERS

§ 43.35–1 *Load line marks for vessels specially constructed for the carriage of complete cargoes of timber (lumber schooner type).* (a) Load lines for existing vessels propelled by either sail or steam which have been specially constructed to carry complete cargoes of timber (that is, of the lumber schooner type) when carrying a complete cargo of timber will be marked with a load line as provided in § 43.01–15. The mark is illustrated by figure 43.35–1 (a).

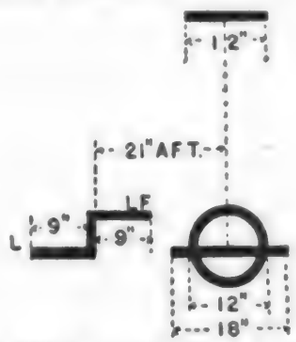


FIGURE 43.35–1 (a).—Timber load line for vessels constructed for the carriage of complete cargoes of timber.

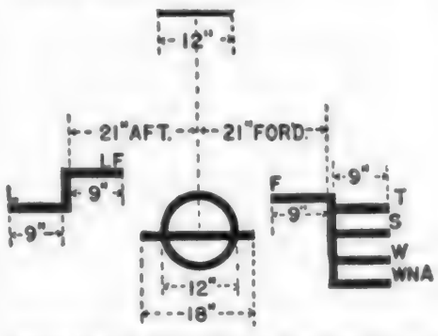


FIGURE 43.35–1 (b).—Timber load line in conjunction with steamer load line for vessels constructed for the carriage of complete cargoes of timber.

(b) Existing vessels which have been specially constructed to carry complete cargoes of timber (the lumber schooner type) and which carry cargoes other than complete timber cargoes, will be marked as provided in § 43.01–15, the marking is illustrated by figure 43.35–1 (b).

(c) The forward mark will be determined as provided in §§ 43.15–1—43.15–97 or §§ 43.20–1—43.20–45, as applicable to the type of vessel dealt with.

SUBPART 43.40—ZONE AND SEASONAL AREAS AND MISCELLANEOUS REQUIREMENTS

§ 43.40–1 *Boundaries of the zones and seasonal areas.* (a) The southern boundary of the northern "winter seasonal" zone is a line drawn from the east coast of North America along the parallel of lat. 36° N. to Tarifa, in Spain; from the east coast of Korea along the parallel of lat. 35° N. to the west coast of Honshu, Japan; from the east coast of Honshu along the parallel of lat. 35° N. to long. 150° W., and thence along a rhumb line to the west coast of Vancouver Island at lat. 50° N., Fusan (Korea) and Yokohama to be considered as being on the boundary line of the northern "winter seasonal" zone and the "summer" zone.

(b) The northern boundary of the "tropical" zone is a line drawn from the east coast of South America at lat. 10° N. along the parallel of lat. 10° N. to long. 20° W., thence north to lat. 20° N. and thence along the parallel of lat. 20° N. to the West Coast of Africa; a line from the east coast of Africa along the parallel of lat. 8° N. to the west coast of the Malay Peninsula, following thence the coast of Malay and Siam to the east coast of Cochin China at lat. 10° N., thence along the parallel of lat. 10° N. to long. 145° E., thence north to lat. 13° N. and thence along the parallel of lat. 13° N. to the west coast of Central America, Saigon to be considered as being on the boundary line of the "tropical" zone and the "seasonal tropical" area (4).

(c) The southern boundary of the "tropical" zone is a line drawn from the east coast of South America along the Tropic of Capricorn to the West Coast of Africa; from the east coast of Africa along the parallel of lat. 20° S. to the west coast of Madagascar, thence along the west and north coast of Madagascar to long. 50° E., thence north to lat. 10° S., thence along the parallel of lat. 10° S. to long. 110° E., thence along a rhumb line to Port Darwin, Australia, thence eastward along the coast of Australia and Wessel Island to Cape Wessel, thence along the parallel of lat. 11° S. to the west side of Cape York from the east side of Cape York at lat. 11° S. along the parallel of lat. 11° S. to long. 150° W., thence along a rhumb line to the point lat. 26° S., long. 75° W., and thence along a rhumb line to the west coast of South America at lat. 30° S., Coquimbo, Rio de Janeiro, and Port Darwin to be considered as being on the boundary line of the "tropical" and "summer" zones.

(d) The following regions are to be included in the "tropical" zone:

(1) The Suez Canal, the Red Sea, and the Gulf of Aden, from Port Said to the meridian of 45° E., Aden and Berbera to be considered as being on the boundary

line of the "tropical" zone and the "seasonal tropical" area 2 (ii)

(2) The Persian Gulf to the meridian of 59° E.

(e) The northern boundary of the southern "winter seasonal" zone is a line drawn from the east coast of South America along the parallel of lat. 40° S. to long. 56° W., thence along a rhumb line to the point lat. 34° S., long. 50° W., thence along the parallel of lat. 34° S. to the west coast of South Africa; from the east coast of South Africa at lat. 30° S. along a rhumb line to the west coast of Australia at lat. 35° S., thence along the south coast of Australia to Cape Arid, thence along a rhumb line to Cape Grim, Tasmania, thence along the north coast of Tasmania to Eddystone Point, thence along a rhumb line to the west coast of South Island, New Zealand, at long. 170° E., thence along the west, south, and east coasts of South Island to Cape Saunders, thence along a rhumb line to the point lat. 33° S., long. 170° W.; and thence along the parallel of lat. 33° S. to the west coast of South America, Valparaiso, Cape Town, and Durban to be considered as being on the boundary line of the Southern "seasonal winter" and "summer" zones.

(f) The remaining areas constitute the "summer" zones. The following areas are seasonal tropical areas:

(1) In the North Atlantic Ocean: An area bounded on the north by a line from Capa Catoche in Yucatan to Cape San Antonio in Cuba, by the South Cuban Coast to lat. 20° N. and by the parallel of lat. 20° N. to the point lat. 20° N., long. 20° W., on the west by the coast of Central America; on the south by the north coast of South America and by parallel of lat. 10° N., and on the east by the meridian of 20° W.

Tropical: 1st November to 15th July.
Summer: 16th July to 31st October.

(2) Arabian Sea: (i) North of lat. 24° N. Karachi is to be considered as being on the boundary line of this area and the seasonal tropical area below.

Tropical: 1st August to 20th May.
Summer: 21st May to 31st July.

(ii) South of lat. 24° N.

Tropical: 1st December to 20th May, and 16th September to 15th October.
Summer: 21st May to 15th September and 16th October to 30th November.

(3) Bay of Bengal:

Tropical: 16th December to 15th April.
Summer: 16th April to 15th December.

(4) In the China Sea: An area bounded on the west and north by the coast of Indo-China and China to Hong Kong, on the east by a rhumb line to the port of Sual (Luzon Island), and by the west coast of the Islands of Luzon, Samar, and Leyte to the parallel of 10° N., and on the south by the parallel of lat. 10° N., Hong Kong and Sual to be considered as being on the boundary of the "seasonal tropical" and "summer" zones.

Tropical: 21st January to 30th April.
Summer: 1st May to 20th January.

(5) In the north Pacific Ocean: (i) An area bounded on the north by the parallel of lat. 25° N., on the west by the meridian of 160° E., on the south by the parallel of lat. 13° N., and on the east by the meridian of 130° W.

Tropical: 1st April to 31st October.
Summer: 1st November to 31st March.

(ii) An area bounded on the north and east by the coast of California, Mexico, and Central America, on the west by the meridian of 120° W., and by a rhumb line from the point lat. 30° N., long. 120° W., to the point lat. 13° N., long. 105° W., and on the south by the parallel of lat. 13° N.

Tropical: 1st March to 30th June and 1st to 30th November.
Summer: 1st July to 31st October and 1st December to 28th/29th February.

(6) In the south Pacific Ocean: (i) An area bounded on the north by the parallel of lat. 11° S., on the west by the east coast of Australia, on the south by the parallel of lat. 20° S., and on the east by the meridian of 175° E., together with the Gulf of Carpentaria south of lat. 11° S. Mackay is to be considered as being on the boundary of the "seasonal tropical" and the "summer" zones.

Tropical: 1st April to 30th November.
Summer: 1st December to 31st March.

(ii) An area bounded on the west by the meridian of 150° W., on the south by the parallel of lat. 20° S., and on the north and east by the rhumb line forming the southern boundary of the tropical zone.

Tropical: 1st March to 30th November.
Summer: 1st December to 28/29th February.

(g) The following are seasonal winter areas: (1) Northern seasonal winter zone (between North America and Europe). (i) In the area within and to the northwards of the following line: A line drawn south from the coast of Greenland at long. 50° W. to lat. 45° N., thence along the parallel of lat. 45° N. to the meridian of 15° W., thence north to lat. 60° N., thence along the parallel of lat. 60° N. to the west coast of Norway, Bergen to be considered as being on the boundary line of this area and area subdivision (ii) of this subparagraph.

Winter: 16th October to 15th April.
Summer: 16th April to 15th October.

(ii) An area outside area subdivision (i) of this subparagraph and north of the parallel of lat. 36° N.

Winter: 1st November to 31st March.
Summer: 1st April to 31st October.

(2) Baltic (bounded by the parallel of latitude of the Skaw).

Winter: 1st November to 31st March.
Summer: 1st April to 31st October.

(3) Mediterranean and Black Sea.

Winter: 16th December to 15th March.
Summer: 16th March to 15th December.

(4) Northern "seasonal winter" zone (between Asia and North America, except Sea of Japan), south of 50° N.

Winter: 16th October to 15th April.
Summer: 16th April to 15th October.

(5) Sea of Japan between the parallels of lat. 35° N. and 50° N.

Winter: 1st December to 28th/29th February.
Summer: 1st March to 30th November.

(6) Southern "seasonal winter" zone.

Winter: 16th April to 15th October.
Summer: 16th October to 15th April.

§ 43.40–5 *Fees, travel expense—Scale of fees.* (a) Table 43.40–5 (a) gives the maximum fees payable by owners for assignment of load line (including load line and condition survey, verification of markings, and issuance of load line certificate).

TABLE 43.40–5 (a)—MAXIMUM FEES

	Classed vessels	Unclassed vessels
Under 500 gross tons	$30.00	$80.00
500 and under 1,000 gross tons	35.00	105.00
1,000 and under 2,000 gross tons	40.00	125.00
2,000 and under 3,000 gross tons	50.00	150.00
3,000 and under 4,000 gross tons	60.00	175.00
4,000 and under 5,000 gross tons	70.00	200.00
5,000 and under 6,000 gross tons	80.00	220.00
6,000 and under 7,000 gross tons	90.00	240.00
7,000 and under 8,000 gross tons	100.00	260.00
8,000 and under 10,000 gross tons	110.00	280.00
10,000 and under 12,000 gross tons	120.00	300.00
12,000 gross tons and above	130.00	320.00

(b) *Fees for renewal of load line certificates.* The fees for condition survey and renewal of load line certificates shall be 50 percent of the above scale. In the case of an American Bureau classed vessel no charge will be made for this survey if carried out in conjunction with a special periodical survey required for maintenance of class and for which a fee is chargeable.

(c) *Fee for annual load line inspection.* The fee for annual load line inspection shall be $25. In the case of a vessel classed by the American Bureau of Shipping, no charge will be made for this inspection if carried out at the same time as a survey to the hull that is required by the rules of the American Bureau of Shipping for maintenance of class and for which a fee is chargeable.

(d) *Traveling expenses.* All traveling expenses incurred in connection with the above surveys will be an additional charge.

§ 43.40–10 *Forms of load line certificates.*

INTERNATIONAL LOAD LINE CERTIFICATE

[Form A1]

Issued under the authority of the United States of America, Commandant, U. S. Coast Guard, under the provisions of the International Load Line Convention, 1930.

[SEAL]

Issued by _____

Certificate No. _____

Name of ship _____ Official No. _____

Port of registry _____ Gross tonnage _____

FREEBOARD FROM DECK LINE

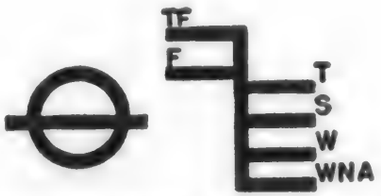
LOAD LINE

Tropical	(T)	_____ Above (S)
Summer	(S)	Upper edge of line through center of disk.
Winter	(W)	_____ Below (S)
Winter (North Atlantic)	(WNA)	_____ Below (S)

*Allowance for fresh water for all freeboards _____

(All measurements are to upper edges of the respective horizontal lines)

The upper edge of the deck line from which these freeboards are measured is _____ inches above the top of the _____ deck at side.



This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been assigned in accordance with the Convention.

**This certificate remains in force until _____ issued at _____ on the _____ day of _____, 19____.

(Here follows the signature or seal and description of the assigning authority.)

NOTE: In accordance with the Load Line Regulations, the disk and lines must be permanently marked by center punch marks or cutting. Letters indicating the assigning authority are to be marked alongside the disk and above the center line. Periodic inspections are to be made at intervals of approximately twelve months.

(On the reverse side of the load line certificate or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal endorsements.)

*Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

**At the expiration of this certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so indorsed on the reverse side.

(Reverse side of certificate)

ANNUAL INSPECTIONS

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

_____ _____ _____

(Signature of Surveyor) (Place) (Date)

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

_____ _____ _____

(Signature of Surveyor) (Place) (Date)

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

_____ _____ _____

(Signature of Surveyor) (Place) (Date)

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

_____ _____ _____

(Signature of Surveyor) (Place) (Date)

RENEWAL OF LOAD LINE CERTIFICATE

The provisions of the Convention being fully complied with by this ship, this certificate is renewed until _____, 19__.

Place _____

Date _____

ASSIGNING AUTHORITY

By _____

(Surveyor)

NOTES

1. The Winter North Atlantic Load Line applies for voyages across the North Atlantic Ocean north of latitude 36° N., during the winter months as defined by the Load Line Regulations. The periods during which the other seasonal load lines apply in different parts of the world are as stated in the Load Line Regulations.

2. This Load Line Certificate will be canceled by the Commandant, U. S. Coast Guard, if—

(a) The periodic inspections have not been carried out.

(b) Material alterations have been made to the hull or superstructures which would affect the calculations determining the position of the load lines.

(c) The fittings and appliances for the protection of the openings, guardrails, freeing ports, or the means of access to the crew's quarters have not been maintained in as effective a condition as they were when the Certificate was issued.

3. When this Certificate has expired or been canceled, it must be delivered to the Assigning Authority.

APPLIANCES FOR CLOSING ACCESS OPENINGS IN BULKHEADS AT ENDS OF DETACHED SUPERSTRUCTURES

Forecastle _____

Bridge, fore end _____

Bridge, after end _____

Poop _____

TEMPORARY APPLIANCES FOR CLOSING OPENINGS IN SUPERSTRUCTURE DECKS

_____

_____

INTERNATIONAL LOAD LINE CERTIFICATE

[Form A 2]

Issued under the authority of the United States of America, Commandant, U. S. Coast Guard, under the provisions of the International Load Line Convention, 1930.

[SEAL]

Issued by _____

Certificate No. _____

Name of ship _____ Official No. _____

Port of registry _____ Gross tonnage _____

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical, Summer, Winter		Upper edge of line below center of disk.
Winter—North Atlantic	(WNA)	Upper edge of line below center of disk.
Allowance for fresh water for all freeboards		

(All measurements are to upper edges of the respective horizontal lines)

The upper edge of the deck line from which these freeboards are measured is _____ inches above the top of the _____ deck at side.

This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been assigned in accordance with the Convention.

*This certificate remains in force until _____ on the _____ day of _____, 19__.

Issued at _____

(Here follows the signature or seal and description of the assigning authority.)

NOTE: In accordance with the Load Line Regulations, the disk and lines must be permanently marked by center punch marks or cutting. Letters indicating the assigning authority are to be marked alongside the disk and above the center line. Periodic inspections are to be made at intervals of approximately 12 months.

(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal endorsements.)

(Reverse side of certificate to be prepared with notes and for endorsements as set forth for Form A 1.)

INTERNATIONAL LOAD LINE CERTIFICATE

[Form A 3]

Issued under the authority of the United States of America, Commandant, U. S. Coast Guard, under the provisions of the International Load Line Convention, 1930.

[SEAL]

Issued by _____

Certificate No. _____ Official No. _____

Name of ship _____ Gross tonnage _____

Port of registry _____

FREEBOARDS FROM DECK LINE		LOAD LINE
Tropical	(T)	Above (S)
Summer	(S)	Upper edge of line through center of disk.
Winter	(W)	Below (S)
Winter (North Atlantic)	(WNA)	Below (S)

*At the expiration of this certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so endorsed on the reverse side.

*Allowance for fresh water for all freeboards _____

The timber freeboards given in this certificate are applicable only when this ship carries a timber deck cargo and complies with the special requirements of the Load Line Regulations regarding timber deck cargoes.

FREEBOARDS FROM DECK LINE		LOAD LINE
Tropical (Timber)	(LT)	Above (S)
Summer (Timber)	(LS)	Above (S)
Winter (Timber)	(LW)	Above (S)
Winter North Atlantic (Timber)	(LWNA)	Below (S)

(All measurements are to upper edges of the respective horizontal line)

The upper edge of the deck line from which these freeboards are measured is _____ inches above the top of the _____ deck at side.

This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been assigned in accordance with the Convention.

LOAD LINE REGULATIONS

**This certificate remains in force until _____ on the _____ day of _____, 19__.

Issued at _____

(Here follows the signature or seal and description of the assigning authority.)

NOTE.—In accordance with the Load Line Regulations, the disk and lines must be permanently marked by center punch marks or cutting. (The diagram showing the timber load line marks is to be inserted above by the assigning authority.) Letters indicating the assigning authority are to be marked alongside the disk and above the center line. Periodic inspections are to be made at intervals of approximately 12 months.

(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal endorsements.)

(Reverse side of certificate to be prepared with notes and for endorsements as set forth for Form A 1.)

LOAD LINE CERTIFICATE

[Form B]

(To be issued to foreign vessels belonging to countries that have not ratified or acceded to the International Load Line Convention, 1930.)

Issued under the authority of the Commandant, U. S. Coast Guard, United States of America, under the provisions of the Load Line Act of March 2, 1929, as amended.

[SEAL]

Issued by _____

Certificate No. _____ Official No. _____

Name of ship _____ Gross tonnage _____

Port of registry _____

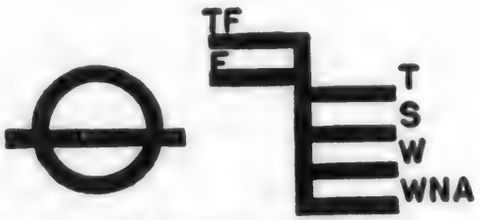
*Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

**At the expiration of this certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so indorsed on the reverse side.

FREEBOARD FROM DECK LINE		LOAD LINE
Summer in tropical seas	(T)	---------- Above (S)
Summer	(S)	Upper edge of line through center of disk.
Winter	(W)	---------- Below (S)
Winter in North Atlantic	(WNA)	---------- Below (S)

*Allowance for fresh water for all freeboards ----------

The upper edge of the deck line from which these freeboards are measured is ---------- inches above the top of the ---------- deck at side.



This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been found to be correctly marked upon the vessel in manner and location as provided by the load line regulations of the Commandant, U. S. Coast Guard.

**This certificate remains in force until ----------

Issued at ---------- on the ---------- day of ----------, 19--

(Here follows the signatures or seal and the description of the authority issuing the certificate.)

NOTE.—In accordance with the Load Line Regulations, the disk and lines must be permanently marked by center punch marks or cutting. Letters indicating the assigning authority are to be marked alongside the disk and above the center lines. This certificate is limited to 1 year and must be renewed annually.

(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for renewal indorsements.)

(Reverse side of certificate)

RENEWAL OF LOAD LINE CERTIFICATE

The provisions of the regulations of the Commandant, U. S. Coast Guard, determining load lines being fully complied with by this ship, this certificate is renewed till ---------- ---------- Place---------- Date----------

Signature or seal and description of authority.

The provisions of the regulations of the Commandant, U. S. Coast Guard, determining load lines being fully complied with by this ship, this certificate is renewed till ---------- ---------- Place---------- Date----------

Signature or seal and description of authority.

*Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

**At the expiration of the certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so indorsed on the reverse side.

NOTES

1. The Winter North Atlantic Load Line applies for voyages across the North Atlantic Ocean north of latitude 36° N., during the winter months as defined by the Load Line Regulations. The periods during which the other seasonal load lines apply in different parts of the world are as stated in the Load Line Regulations.

2. This Load Line Certificate will be canceled by the Commandant, U. S. Coast Guard if—

(a) Material alterations have been made to the hull or superstructure which would affect the calculations determining the position of the load lines.

(b) The fittings and appliances for the protection of the openings, guardrails, freeing ports, or the means of access to the crew's quarters have not been maintained in as effective a condition as they were when the Certificate was issued.

3. When this Certificate has expired or been canceled, it must be delivered to the Assigning Authority.

APPLIANCES FOR CLOSING ACCESS OPENINGS IN BULKHEADS AT ENDS OF DETACHED SUPERSTRUCTURES

Forecastle ----------

Bridge, fore end ----------

Bridge, after end ----------

Poop ----------

TEMPORARY APPLIANCES FOR CLOSING OPENINGS IN SUPERSTRUCTURE DECKS

COASTWISE LOAD LINE CERTIFICATE

[Form C1]

Issued under the authority of the United States of America, Commandant, U. S. Coast Guard, under the provisions of the Coastwise Load Line Act, 1935, as amended.

[SEAL]

Issued by ----------

Certificate No. ----------

Name of ship ---------- Official No. ----------

Port of registry ---------- Gross tonnage ----------

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	(T)	---------- Above (S)
Summer	(S)	Upper edge of line through center of disk.
Winter	(W)	---------- Below (S)

*Allowance for fresh water for all freeboards----------

(All measurements are to upper edges of the respective horizontal lines.)

The upper edge of the deck line from which these freeboards are measured is ---------- inches above the top of the -------- deck at side.

This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been assigned in accordance with the Commandant, U. S. Coast Guard, Coastwise Load Line Regulations.

**This certificate remains in force until ----------

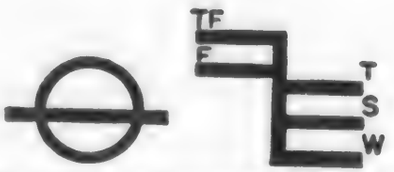
Issued at ---------- on the -------- day of ----------, 19--.

(Here follows the signature or seal and description of the assigning authority.)

NOTE: In accordance with the Load Line Regulations the disk and lines must be permanently marked by center punch marks or cutting. Letters indicating the assigning authority are to be marked alongside the disk and above the center line. Periodic inspections are to be made at intervals of approximately 12 months.

*Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

**At the expiration of the certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so indorsed on the reverse side.



(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal endorsements.)

(Reverse side of certificate)

ANNUAL INSPECTION

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

---------- ---------- ----------
(Signature of Surveyor) (Place) (Date)

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

---------- ---------- ----------
(Signature of Surveyor) (Place) (Date)

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

---------- ---------- ----------
(Signature of Surveyor) (Place) (Date)

I have surveyed this ship for the purpose of seeing whether this certificate should remain in force and the survey has been completed to my satisfaction.

---------- ---------- ----------
(Signature of Surveyor) (Place) (Date)

RENEWAL OF LOAD LINE CERTIFICATE

The provisions of the Coastwise Load Line Regulations of the Commandant, U. S. Coast Guard, being fully complied with by this ship, this certificate is renewed until ----------, 19--.

Place ----------
Date ----------

Assigning Authority
By ----------
(Surveyor)

NOTES

1. The periods and areas during which the seasonal load lines apply are as stated in the Load Line Regulations.

2. This Load Line Certificate will be canceled by the Commandant, U. S. Coast Guard, if—

(a) The periodic inspections have not been carried out.

(b) Material alterations have been made to the hull or superstructures which would affect the calculations determining the position of the load lines.

(c) The fittings and appliances for the protection of the openings, guard rails, freeing ports, or the means of access to the crew's quarters have not been maintained in as effective a condition as they were when the Certificate was issued.

3. When this certificate has expired or been canceled, it must be delivered to the Assigning Authority.

APPLIANCES FOR CLOSING ACCESS OPENINGS IN BULKHEADS AT ENDS OF DETACHED SUPERSTRUCTURES

Forecastle ----------
Bridge, fore end ----------
Bridge, after end ----------
Poop ----------

TEMPORARY APPLIANCES FOR CLOSING OPENINGS IN SUPERSTRUCTURE DECKS

COASTWISE LOAD LINE CERTIFICATE

[Form C2]

Issued under the authority of the United States of America, Commandant, U. S. Coast Guard, under the provisions of the Coastwise Load Line Act, 1935, as amended.

[SEAL]

Issued by ----------
Certificate No. ----------
Name of ship ---------- Official No. ----------
Port of registry ---------- Gross tonnage ----------

FREEBOARD FROM DECK LINE	LOAD LINE
Tropical / Summer / Winter ----------	Upper edge of line through center of disk.

Allowance for fresh water for all freeboards ----------

(All measurements are to upper edges of the respective horizontal lines.)

The upper edge of the deck line from which these freeboards are measured is ---------- inches above the top of the ---------- deck at side.

This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been assigned in accordance with the Commandant, U. S. Coast Guard, Coastwise Load Line Regulations.

*This certificate remains in force until ----------
Issued at ---------- on the ---------- day of ----------, 19--.

(Here follows the signature or seal and description of the assigning authority.)

NOTE: In accordance with the Load Line Regulations, the disk and lines must be permanently marked by center punch marks or cutting. Letters indicating the assigning authority are to be marked alongside the disk and above the center line. Periodic inspections are to be made at intervals of approximately twelve months.

(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal indorsements.)

(Reverse side of certificate to be prepared with notes and for endorsements as set forth for Form C1.)

*At the expiration of this certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so indorsed on the reverse side.

COASTWISE LOAD LINE CERTIFICATE

[Form C3]

Issued under the authority of the United States of America, Commandant, U. S. Coast Guard, under the provisions of the Coastwise Load Line Act, 1935, as amended.

[SEAL]

Issued by _____

Certificate No. _____

Name of ship _____ Official No. _____

Port of registry _____ Gross tonnage _____

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical _____	(T)	_____ Above (S)
Summer _____	(S)	Upper edge of line through center of disk.
Winter _____	(W)	_____ Below (S)

*Allowance for fresh water for all freeboards _____

The timber freeboards given in this certificate are applicable only when this ship carries a timber deck cargo and complies with the special requirements of the Load Line Regulations regarding timber deck cargoes.

FREEBOARDS FROM DECK LINE		LOAD LINE
Tropical (Timber) _____	(LT)	_____ Above (S)
Summer (Timber) _____	(LS)	_____ Above (S)
Winter (Timber) _____	(LW)	_____ Above (S) / Below (S)

(All measurements are to upper edges of the respective horizontal lines.)

The upper edge of the deck line from which these freeboards are measured is _____ inches above the top of the _____ deck at side.

This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been assigned in accordance with the Commandant, U. S. Coast Guard, Coastwise Load Line Regulations.

**This certificate remains in force until _____

Issued at _____ on the _____ day of _____, 19__.

(Here follows the signature or seal and description of the assigning authority.)

NOTE: In accordance with the Load Line Regulations, the disk and lines must be permanently marked by center punch marks or cutting. (The diagram showing the timber load line marks is to be inserted above by the assigning authority.) Letters indicating the assigning authority are to be marked alongside the disk and above the center line. Periodic inspections are to be made at intervals of approximately twelve months.

(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal indorsements.)

(Reverse side of certificate to be prepared with notes and for endorsements as set forth for Form C1.)

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*Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

**At the expiration of this certificate, renewal should be obtained in accordance with the Load Line Regulations and if upon examination the ship is found to be in a satisfactory condition, this certificate will be extended and so indorsed on the reverse side.

§ 43.40–15 *Titles of load line laws and rules regarded as equivalent to the British Board of Trade Rules, 1906*—(a) *Australia.* Part IV of the Navigation Act, 1912–1920, and Navigation (Load Line) Regulations of the 17th December 1924.

(b) *Belgium.* Loi sur la sécurité des navires (7 décembre 1920).

(c) *Chile.* Reglamento para el trazato del disco marcas y linea oficial de carguio de las naves mercantes (Decree No. 1892 of the 12th November 1919).

(d) *Denmark.* Merchant Shipping (inspection of ships) Act of the 29th March 1920, with later amendments.

Rule and Tables of Freeboard for Ships, dated the 30th September 1909, as amended by notification of the 25th July 1918.

(e) *France.* Loi du 17 avril 1907, arrête du 5 septembre 1908. Décret du 21 septembre 1908. Autre décret du 21 septembre 1908 modifie par le décret du 1 septembre 1925. Décret du 12 mai 1927. Décret du 17 janvier 1928.

(f) *Germany.* Vorschriften der See-Berufsgenossenschaft uber den Feibord für Dampfer und Segelschiffe, Ausgabe 1908.

(g) *Hong Kong.* Merchant shipping consolidation ordinance (No. 10 of 1899), as amended by ordinances Nos. 31 of 1901, 2 of 1903, 5 of 1905, 16 of 1906, 9 of 1909, and 6 of 1910.

(h) *Iceland.* Law No. 58 of the 14th June, 1929, sections 25–26.

(i) *India.* Indian Merchant Shipping Act, 1923.

(j) *Italy.* Regole e tavole per assignazione del "Bordo Libero" approved by decree dated the 1st February 1929—VII of the Italian Minister for Communications.

Prior to 1929—British Board of Trade Rules, 1906.

(k) *Japan.* Ship load line law [Law No. 2 of the 10th year of Taisho (1921)] and the rules and regulations relating thereto.

(l) *Netherlands.* Decree of the 22d September 1909 (Official Journal No. 315).

(m) *Netherland Indies.* Netherlands decree of the 22d September 1909 (Official Journal No. 315).

(n) *New Zealand.* British Board of Trade Rules, 1906.

(o) *Norway.* Norwegian Freeboard Rules and Tables of 1909.

(p) *Portugal.* Decree No. 11,210 of the 18th July 1925, and regulations and instructions relating thereto.

(q) *Spain.* Reglamento para el Trazado del Disco y Marcas de Maxima Carga de los buques marchantes, 1914.

(r) *Straits Settlements.* British Board of Trade Rules, 1906.

(s) *Sweden.* Rules and Tables of Freeboard approved by decree of the 21st May 1910.

(t) *United Kingdom.* Board of Trade Rules, 1906.

(u) *Union of Soviet Socialist Republics.* Rules and Regulations relating to the Load Lines of Seagoing Merchant Vessels, published by Register of the Union of Soviet Socialist Republics, 1928.

PART 44—VARIANCE FOR STEAM COLLIERS, TUGS, BARGES, AND SELF-PROPELLED BARGES (WHEN ENGAGED IN SPECIAL SERVICES OR COASTWISE AND INTER-ISLAND VOYAGES)

Part 44 is amended to read as follows:

SUBPART 44.01—ADMINISTRATION

Sec.

44.01–1 Establishment of regulations for special service.
44.01–5 Administration; special service.
44.01–10 Approval by Commandant of special service.
44.01–15 Special service certificate.
44.01–20 New and existing vessels; special service.

SUBPART 44.05—RULES OF ASSIGNMENT; SPECIAL SERVICE

44.05–1 General.
44.05–5 Definitions.
44.05–10 Load Line markings.
44.05–15 Existing vessels.
44.05–20 Conditions of assignment.
44.05–25 Freeboards.
44.05–30 Load line certificates.
44.05–35 Form of load line certificates.

AUTHORITY: §§ 44.01–1 to 44.05–35 issued under sec. 2, 49 Stat. 888, as amended; 46 U. S. C. 88a.

SUBPART 44.01—ADMINISTRATION

§ 44.01–1 *Establishment of regulations for special service.* (a) Pursuant to the Coastwise Load Line Act, 1935, as amended June 20, 1936 (49 Stat. 888, 1543; 46 U. S. C. 88–88g), the Commandant, U. S. Coast Guard, under the direction and supervision of the Secretary of Treasury, is vested with discretion to vary the load line marks from those established by the International Load Line Treaty, 1930, on steam colliers, tugs,

barges, and self-propelled barges engaged in special services on inter-island voyages, and on coastwise voyages from port to port in the continental United States, the following regulations in this part are hereby established.

§ 44.01–5 *Administration; special service.* (a) The administrative provisions of §§ 43.01–1—43.01–100 of this subchapter, relating to vessels engaged in foreign and coastwise voyages, where applicable, shall apply to vessels subject to this part except as modified in paragraph (b) of this section.

(b) Application for the assignment of load lines under this part for the above classes of vessels shall be made to the Commandant, U. S. Coast Guard, stating:

(1) Name of vessel and official number.

(2) Type of vessel (steam collier, tug, barge, or self-propelled barge).

(3) Date keel was laid.

(4) Normal sea speed of vessel.

(5) Limits of voyage for which approval is requested.

(6) Normal maximum distance off shore in course of voyage.

(7) Length of voyage in days and nautical miles.

(8) Statement of weather conditions to be expected.

(9) Cargo to be carried.

§ 44.01–10 *Approval by Commandant, U. S. Coast Guard, of special service.* (a) Whenever the Commandant, U. S. Coast Guard, shall find that the position of the load line for the classes of vessels above stated may be varied safely from the position fixed by the International Load Line Treaty, 1930, and that any such change will not locate the load line above the actual line of safety, he may approve load lines, as determined by this part for steam colliers, tugs, barges, and self-propelled barges (separately by class) to be applicable between two specific ports of the continental United States and the intermediate continental United States ports between these limits or between the islands of a group over which the United States has jurisdiction. The marking of such load lines and the certifications thereof shall be in accordance with this part and the load line certificate shall define the limits of the voyage for which the load lines are valid.

§ 44.01–15 *Special service certificate.* (a) The use of the special service load line certificate issued under this part is limited to voyages only as described in the certificate. If the vessel engages on any voyage not contemplated by the certificate where a load line is required, the load line prescribed by Part 43 of this subchapter shall govern.

(b) Vessels engaged on special services in the coastwise trade and the inter-island trade will be certificated on the form shown in § 44.05–35.

§ 44.01–20 *New and existing vessels; special service.* (a) A new vessel marked with load lines for special service on a coastwise or inter-island voyage is a vessel whose keel was laid on or after September 28, 1937. An existing vessel is one whose keel was laid before that date.

SUBPART 44.05—RULES OF ASSIGNMENT; SPECIAL SERVICE

§ 44.05–1 *General.* (a) The load line regulations in this part are complementary to those in Part 43 or Part 45 (Great Lakes load line regulations) of this subchapter, as reference is made thereto.

§ 44.05–5 *Definitions.* (a) A steam collier is a vessel mechanically propelled, and specially designed for the carriage of coal in bulk.

(b) A tug is a vessel specially designed for towing vessels or floating equipment.

(c) A towed barge is a vessel without sufficient means for self-propulsion and which requires to be towed.

(d) A self-propelled barge is a vessel mechanically propelled of the type specially designed for use in limited coastwise and Great Lakes service and capable of transiting inter-connecting canals.

§ 44.05–10 *Load line markings.* (a) The load line marks on the vessel's sides are to be in accordance with § 43.05–15 of this subchapter, Figure 43.05–5. Seasonal markings such as "Winter North Atlantic" which are not applicable to the voyage will be omitted.

(b) In the case of vessels which engage in special services on coastwise voyages and voyages on the Great Lakes, the marks on the vessel's sides are to be in accordance with figure 44.05–10 (b) shown below.

(c) The load lines aft of the combined disk and diamond will be applicable for voyages on the Great Lakes and those on the forward side will be applicable to limited coastwise voyages. The summer line on the ocean will correspond to the summer line on the Lakes and the winter line on the ocean will correspond to the intermediate line on the Lakes.

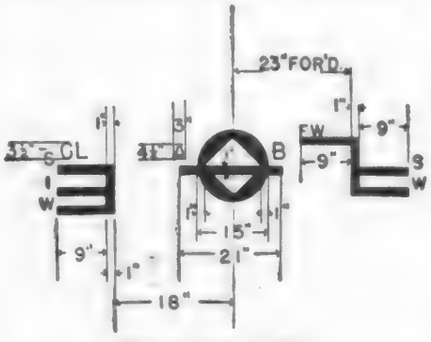


FIGURE 44.05–10 (b).

(d) In the case of vessels which operate both on special service coastwise voyages and on unlimited coastwise voyages, the marks on the ship's sides are to be in accordance with figure 44.05–10 (d). The load lines aft of the disk will be applicable to voyages in special service coastwise or inter-island voyages and those on the forward side will be applicable to unlimited coastwise voyages. (A vessel marked for both special service and unlimited coastwise voyages and furnished with a load line certificate on the international form shall, when entering the foreign trade, arrange that the load line markings are in accord with the vessel's international load line certificate by the elimination of the marks aft of the disk.)

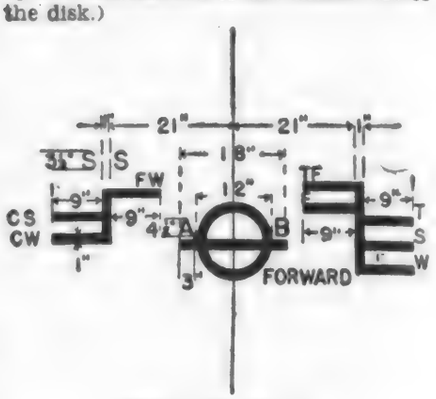


FIGURE 44.05–10 (d).

§ 44.05–15 *Existing vessels.* (a) In assigning load lines to an existing vessel the provisions of the regulations in this part shall be complied with in principle and detail insofar as is reasonable and practicable, having regard to the proven efficacy of existing arrangements for a special service voyage, and having particular regard to the provision of sufficient means for the protection and safety of the crew.

(b) Where it is neither reasonable nor practicable to comply with this part in its entirety, the assigning authority will, in each case, report to the Commandant, U. S. Coast Guard, the specific matters in which the vessel is deficient with such recommendations as may seem desirable. Upon the receipt of this report the Commandant, U. S. Coast Guard, shall determine such addition to the freeboard as will, in the judgment of the Commandant, U. S. Coast Guard, make the vessel as safe as if it had fully complied with this part.

§ 44.05–20 *Conditions of assignment*—(a) *Steam colliers.* The conditions of assignment for steam colliers shall be in accordance with the requirements of Part 43 of this subchapter and also with the supplementary requirements of §§ 43.30–1—43.30–70 of this subchapter in cases where a tanker freeboard is assigned, except that in the case of steam colliers constructed with bulwarks, the freeing port may be of a practically continuous slot type, located as low as possible, the clear area of the slot to be not less than 20 percent of the superficial area of the unpierced bulwarks. If, due to sheer, or other conditions, the assigning authority considers that extra local provision should be made for freeing decks of water, the slots are to be located so as to have maximum efficacy.

(b) *Tugs.* The conditions of assignment for tugs shall be in accordance with the provisions of §§ 45.10–5—45.10–100 of this subchapter and in addition port lights in exposed casings leading to spaces below the freeboard deck shall be fitted with deadlights.

(c) *Towed barges.* The conditions of asignment for towed cargo barges where the cargo is carried under deck shall be in accordance with §§ 45.10–5—45.10–100

of this subchapter. In the case of tank barges and cargo barges carrying cargo only on deck, compliance will also be required with the supplementary conditions of §§ 45.20–1—45.20–70 of this subchapter. In the case of towed cargo barges of the open type, the construction of the vessel must be such as to satisfy the assigning authority that no unusual hazards will be experienced.

(d) *Self-propelled barges.* The conditions of assignment for self-propelled cargo barges carrying cargo under decks shall be in accordance with the provisions of §§ 45.10–5—45.10–100 of this subchapter. In the case of self-propelled tank barges and self-propelled cargo barges carrying cargo only on deck, compliance will also be required with the supplementary conditions of §§ 45.20–1—45.20–70 of this subchapter.

§ 44.05–25 *Freeboards.* (a) *General.* When the assigning authority is satisfied that the requirements of this part as applicable to the type of vessel under consideration are complied with the freeboards will be computed as described in this section.

(b) *Steam colliers.* Steam colliers that have constructional features similar to those of a tanker which afford extra invulnerability against the sea may be assigned a reduction of freeboard from that determined under §§ 43.15–1—43.15–97 of this subchapter. The amount of such reduction shall be determined by the assigning authority, with the approval of the Commandant, U. S. Coast Guard, in relaton to the freeboard assigned to tankers, having regard to the degree of compliance with the supplementary conditions of assignment laid down for these ships, but without regard to the degree of subdivision provided. The freeboard assigned to such vessel shall in no case be less than would be assigned the vessel as a tanker, as determined by §§ 43.30–1—43.30–70 of this subchapter.

(c) *Tugs.* The freeboard is to be computed in accordance with §§ 45.15–1—45.15–97 of this subchapter. The fresh water and seasonal markings where applicable are to be the same as determined from §§ 43.15–1—43.15–97 of this subchapter.

(d) *Towed cargo barges with cargo under deck.* The freeboard is to be computed under §§ 45.15–1—45.15–97 of this subchapter. The fresh water and seasonal markings where applicable are to be determined from §§ 43.15–1—43.15–97 of this subchapter.

(e) *Towed cargo barges with cargo only on deck.* The freeboard for barges of this type is to be computed in accordance with the requirements of §§ 45.20–1—45.20–70 of this subchapter. The fresh water and seasonal markings where applicable are to be the same as determined from §§ 43.15–1—43.15–97 of this subchapter.

(f) *Towed cargo barges of the open type.* The load line will be placed where, in the judgment of the assigning authority, with the approval of the Commandant, U. S. Coast Guard, the draft will be such that no unusual hazard will be experienced.

(g) *Towed tank barges.* The freeboard is to be computed in accordance with §§ 45.20–1—45.20–70 of this subchapter. The fresh water and seasonal markings where applicable are to be determined from §§ 43.15–1—43.15–97 of this subchapter.

(h) *Self-propelled cargo barges.* The freeboard is to be computed under §§ 45.15–1—45.20–15 of this subchapter. The fresh water and seasonal markings where applicable are to be determined from §§ 43.15–1—43.15–97 of this subchapter.

(i) *Self-propelled tank barges.* The freeboard is to be computed in accordance with §§ 45.20–1—45.20–70 of this subchapter. The fresh water and seasonal markings where applicable are to be determined from §§ 43.15–1—43.15–97 of this subchapter.

§ 44.05–30 *Load line certificates.* (a) The load line certificates for a special service coastwise or special service inter-island voyage are to be on the forms shown in § 44.05–35.

§ 44.05–35 *Form of load line certificate.*

LOAD LINE CERTIFICATE FOR A SPECIAL SERVICE COASTWISE OR INTER-ISLAND VOYAGE

Issued under the authority of the Commandant, U. S. Coast Guard, United States of America, under the provisions of the Coastwise Load Line Act of August 27, 1935, as amended.

[SEAL]

Issued by _____

Certificate No._____

This certificate is valid only for coastwise or inter-island voyages that are between the limits of_____ and_____ provided the vessel is engaged solely in the trade stated herein.

Ship_____ Official No._____

Port of registry_____ Trade of vessel_____

Gross tonnage_____

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical_____	(T)	_____Above (S)
Summer_____	(S)	__Upper edge of line through center of disk.
Winter_____	(W)	_____Below (S)

*Allowance for fresh water for all freeboards (except on the Great Lakes) _____

The upper edge of the deck line from which these freeboards are measured is____ inches above the top of the____deck at side.

This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been found to be correctly marked upon the vessel in manner and location as provided by the Load Line Regulations of the Commandant, U. S. Coast Guard, applicable to vessels engaged on this special service voyage.

**This certificate remains in force until _____ Issued at_____ on the_____ day of_____, 19____.

(Here follows the signature or seal and description of the assigning authority)

NOTE: In accordance with the Load Line Regulations the disc or diamond and the lines must be permanently marked by center punch marks or cutting.

(On the reverse side of the load line certificate, the provision for annual inspection endorsement and for renewal of the certificate is to be the same as for vessels engaged in the foreign trade.)

*Where seagoing steamers navigate a river or inland water, deeper loading is permitted corresponding to the weight of fuel, etc., required for consumption between the point of departure and the open sea.

**Upon the expiration of the certificate renewal must be obtained as provided by the Load Line Regulations and the certificate so endorsed. Endorsement should also be made in the spaces provided on the occasion of each annual inspection required by the Load Line Regulations.

PART 45—MERCHANT VESSELS WHEN ENGAGED IN A VOYAGE ON THE GREAT LAKES

Part 45 is amended to read as follows:

SUBPART 45.01—ADMINISTRATION

45.01–1	Establishment of regulations.
45.01–5	Responsibility for administration.
45.01–10	Application of regulations.
45.01–15	Tankers.
45.01–20	Vessels of special design.
45.01–25	Marks to indicate maximum load lines.
45.01–30	Assignment and certification of load lines; assigning authority.
45.01–35	Survey for the assignment of new load line and renewal of load line certificate.
45.01–40	Annual load line inspection.
45.01–45	Application for assignment, renewal, and certification of load line marks.
45.01–50	Application for annual load line inspections.
45.01–55	Equivalents.
45.01–60	Validity of certificates; renewal of certificates.
45.01–65	Form of certificate.
45.01–70	Cancelation of load line certificates.
45.01–75	Seasonal load lines.
45.01–80	Log book entries.
45.01–85	Control.
45.01–90	Approval of the Commandant.

SUBPART 45.05—GENERAL RULES FOR DETERMINING MAXIMUM LOAD LINES OF MERCHANT VESSELS ON THE GREAT LAKES

Sec.
45.05–1 Definitions.
45.05–5 Deck line.
45.05–10 Load line diamond.
45.05–15 Lines to be used in connection with the diamond.
45.05–20 Mark of assigning authority.
45.05–25 Details in marking.
45.05–30 Verification of marks.

SUBPART 45.10—CONDITIONS OF ASSIGNMENT OF LOAD LINES

45.10–1 Construction of vessel.
45.10–5 Cargo and other hatchways not protected by superstructures.
45.10–10 Hatchway coamings.
45.10–15 Hatchway covers.
45.10–20 Hatchway beams.
45.10–25 Carries or sockets.
45.10–30 Cleats and fasteners.
45.10–35 Battens and wedges.
45.10–40 Tarpaulins.
45.10–45 Security of hatchway covers.
45.10–50 Cargo and other hatchways in the freeboard deck within superstructure which are fitted with closing appliances less efficient than class 1.
45.10–55 Hatchway coamings and closing arrangements.
45.10–57 Machinery space openings in exposed positions on freeboard and raised quarter-decks.
45.10–60 Machinery space openings in exposed positions on superstructure decks other than raised quarter-decks.
45.10–65 Machinery space openings in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.
45.10–67 Flush scuttles.
45.10–70 Companionways.
45.10–75 Ventilators in exposed positions on freeboard and superstructure decks.
45.10–77 Air pipes.
45.10–80 Gangway, cargo and coaling ports.
45.10–85 Scuppers and sanitary discharge pipes.
45.10–87 Airports.
45.10–90 Guard rails.
45.10–95 Freeing ports.
45.10–100 Protection of crew.

SUBPART 45.15—LOAD LINES FOR STEAMERS

Sec.
45.15–1 Length (L).
45.15–5 Breadth (B).
45.15–7 Molded depth.
45.15–10 Depth for freeboard (D).
45.15–15 Coefficient of fineness (C).
45.15–17 Strength.
45.15–20 Height of superstructure.
45.15–25 Standard height of superstructure.
45.15–27 Length of superstructure (S).
45.15–30 Enclosed superstructure.
45.15–35 Superstructure bulkheads.
45.15–37 Class 1 closing appliances.
45.15–40 Class 2 closing appliances.
45.15–45 Temporary closing appliances.
45.15–47 Superstructures, general.
45.15–50 Poop.
45.15–55 Raised quarter-deck.
45.15–57 Bridge.
45.15–60 Forecastle.
45.15–65 Trunk.
45.15–67 Inclosed superstructure with middle line openings in the deck not provided with permanent means of closing.
45.15–70 Deductions for superstructures.
45.15–73 Sheer, general.
45.15–75 Standard sheer profile.
45.15–77 Measurement of variations from standard sheer profile.
45.15–80 Correction for variations from standard sheer profile.
45.15–83 Addition for deficiency in sheer.
45.15–85 Deduction for excess sheer.
45.15–87 Standard round of beam.
45.15–90 Round of beam correction.
45.15–93 Summer freeboard.
45.15–95 Intermediate and winter freeboard.
45.15–97 Freeboard table for steamers.

SUBPART 45.20—LOAD LINES FOR TANKERS

45.20–1 Definition.
45.20–5 Marks on sides.
45.20–10 Construction.
45.20–15 Forecastle.
45.20–20 Machinery casings.
45.20–25 Gangway.
45.20–30 Protection of crew, access to machinery space, etc.
45.20–35 Hatchways.
45.20–40 Ventilators.
45.20–45 Freeing arrangements.
45.20–50 Plans.
45.20–55 Computation of freeboard.
45.20–60 Deductions for detached superstructures.
45.20–65 Deduction for excess sheer.
45.20–70 Freeboard table for tankers.
45.20–75 Fees, travel expense.
45.20–80 Form of load line certificate.

AUTHORITY: §§ 45.01–1 to 45.20–80 issued under sec. 2, 49 Stat. 888, as amended; 46 U. S. C. 88a.

SUBPART 45.01—ADMINISTRATION

§ 45.01–1 *Establishment of regulations.* (a) Load lines are established by this part for merchant vessels of 150 gross tons or over when engaged in a voyage on the Great Lakes in conformity with the Coastwise Load Line Act, 1935, amended June 20, 1936 (49 Stat. 888, 1543; 46 U. S. C. 88–88i), and effective as to vessels of 4,000 gross tons and upwards November 27, 1935, and as to all other vessels subject thereto August 27, 1936.

§ 45.01–5 *Responsibility for administration.* (a) The Commandant, U. S. Coast Guard, is vested with the responsibility and authority, under direction and supervision of the Secretary of the Treasury, for the administration of the Coastwise Load Line Act, 1935, as amended by the act of June 20, 1936.

§ 45.01–10 *Application of regulations.* (a) After November 27, 1935, no merchant vessel of 4,000 gross tons or over shall proceed from any port or place in the United States on the Great Lakes for a voyage on the Great Lakes and after August 27, 1936, no merchant vessel of 150 gross tons and upwards to 4,000 gross tons shall proceed from any port or place in the United States on the Great Lakes for a voyage on the Great Lakes unless such vessel is:

(1) Marked with load lines under the load lines regulations in Part 43 of this subchapter and has on board a valid load line certificate, or

(2) A foreign vessel exempted under section 5 of the Coastwise Load Line Act, 1935, or is marked and certificated as to load lines under the provisions of and in accordance with the International Load Line Convention 1930 and has on board a valid load line certificate, or

(3) A new vessel:

(i) Has been surveyed in accordance with the provisions of this part.

(ii) Complies with the provisions of this part as applicable to the type of vessel dealt with.

(iii) Has been marked in accordance with the provisions of this part.

(iv) Has had the marks certified as correct as provided by this part.

(A new vessel is one whose keel was laid on or after August 27, 1935.)

(4) An existing vessel:

(i) Has been surveyed, marked, and the marks certified either under the provisions of the regulations in this part as applicable to the type of vessel, or

(ii) Complies as defined for the type of vessel with the provisions of this part in principle and detail so far as is reasonable and practicable, having regard to the efficacy of the protection of openings, guard rails, freeing ports, and means of access to crews quarters, provided by the existing arrangements, fittings, and appliances of the vessel.

(b) Where it is neither reasonable nor practicable to comply with this part in its entirety, the assigning authority will, in each case, report to the Commandant, U. S. Coast Guard, the specific matters in which the vessel is deficient with such recommendations as seem desirable. Upon the receipt of this report the Commandant, U. S. Coast Guard, shall determine such addition to the freeboard as will, in the judgment of the Commandant, U. S. Coast Guard, make the vessel as safe as if it had fully complied with this part.

§ 45.01–15 *Tankers.* (a) A steamer specially constructed for the carriage of liquid cargoes in bulk which has been surveyed as provided by § 45.01–10 shall be marked with tanker load lines and the marks certified as correct, if being:

(1) A new vessel, it complies with the conditions and provisions prescribed in §§ 45.20–10—45.10–70.

(2) An existing vessel, it complies with the conditions and provisions in §§ 45.20–10, 45.20–25—45.20–40 and, also, in principle so far as is reasonable and practicable, with §§ 45.20–15, 45.20–20, 45.20–45: *Provided*, That in assigning a tanker load line to an existing vessel such additions to the freeboard shall be made as is reasonable having regard to the extent to which the vessel falls short of full compliance with the conditions and provisions prescribed in §§ 45.20–15, 45.20–20, 45.20–45.

§ 45.01–20 *Vessels of special design.* (a) Sand suckers, open hopper barges, and other vessels of special design that cannot be assigned load lines by direct application of the rules set forth herein, will be assigned load lines based on the individual consideration of each vessel, and before such vessels are marked and certified, the assigning authority shall obtain the approval of the Commandant, U. S. Coast Guard, as to the position of the load line marks.

§ 45.01–25 *Marks to indicate maximum load lines.* (a) Marks to indicate maximum mean drafts to which a vessel can be lawfully submerged, in the various circumstances and seasons, shall be permanently marked on each side of the vessel in the form, manner, and location provided by this part.

§ 45.01–30 *Assignment and certification of load lines; assigning authority.* (a) As provided in the Coastwise Load Line Act, 1935, the American Bureau of Shipping is appointed to assign load lines and to determine whether the position of and the manner of marking each vessel to which the act applies has been performed in accordance with this part, and is authorized to issue a load line certificate, certifying to the correctness of the marks under its own hand and seal. The assigning authority is authorized to renew from time to time by indorsement a load line certificate. Load line certificates will not be issued until the load line marks have been verified. This certificate will be issued in duplicate, one copy being delivered to the owner or master of the vessel and one copy, together with a summary of the data used to determine the load line, will be forwarded to the Commandant, U. S. Coast Guard, Washington, D. C. In addition, effective January 1, 1948, each new vessel, when receiving its first load line certificate, shall be furnished a copy of the load line survey report which shall be retained on board to be available for the information of inspectors and surveyors when carrying out subsequent load line surveys.

(b) The agency appointed by the Commandant, U. S. Coast Guard, to assign load lines as provided by section 3 of the Coastwise Land Line Act, 1935 (49 Stat. 888; 46 U. S. C. 88b), is referred to in this part as the assigning authority.

(c) The fees to be charged by the assigning authority for services in connection with this part shall not exceed the scale of maximum fees as set forth in § 45.20–75.

§ 45.01–35 *Survey for the assignment of new load line and renewal of load line certificate*—(a) *Steel vessels.* (1) Unless specifically waived by the Commandant, U. S. Coast Guard, the vessel is to be placed in dry dock to determine the condition of the hull plating and underwater connections.

(2) The holds, 'tween decks, peaks, bilges, engine and boiler spaces, and bunkers are to be examined to determine the condition of the structure.

(3) Deep tanks and other tanks which form part of the vessel are to be examined internally.

(4) Where a double bottom is fitted, the tanks are to be examined internally. Where double bottom and other tanks are used for fuel-oil bunkers, such tanks need not be cleaned out, provided the surveyors are able to determine by an external examination that their general condition is satisfactory.

(5) The decks are to be examined.

(6) The hatch covers, hatch beams, and fore-and-afters, tarpaulins, battens and wedges, the hatchway and ventilator coamings, companionways, the engine and boiler casings, the superstructures on the freeboard deck, and all means of protecting the openings in the freeboard deck and superstructures are to be examined.

(7) All air pipe outlets, scuppers, sanitary discharges in the vessel's sides, and air ports are to be examined.

(8) All gangways, cargo, and coaling ports or similar openings in the vessel's sides are to be examined.

(9) Guard rails, gangways, and freeing ports are to be examined.

(10) Where, owing to the age and condition of the vessel, the surveyors deem it necessary, the shell and deck plating may be required to be drilled in order to ascertain the thickness of such plating.

(b) *Wood and composite vessels.* (1) Unless specifically waived by the Commandant, U. S. Coast Guard, the vessel is to be placed on a drydock or a slipway and the keel, stem, sternframe or sternpost, and outside planking are to be examined. Caulking is to be tried at such places about the planking as is deemed necessary by the surveyors.

(2) Careful examination must be made for faulty fastenings and such bolts or treenails must be backed out, or otherwise dealt with, as may be deemed necessary by the surveyors.

(3) Careful examination is to be made of the entire structure and, if considered necessary, borings are to be made to ascertain the conditions of the material; should these disclose cause for further examination, listings are to be made where required to satisfy the surveyors as to the true condition of the vessel.

(4) The holds, 'tween decks, peaks, bilges, engine and boiler spaces, and bunkers are to be examined.

(5) The decks are to be examined and bored where necessary.

(6) The hatch covers, hatch beams, fore-and-afters, tarpaulins, battens, and wedges, the hatchway and ventilator coamings, companionways, the engine and boiler casings, the superstructures on the freeboard deck, and all means of protecting the openings in the freeboard deck and superstructures are to be examined.

(7) All air pipe outlets, scuppers, sanitary discharges in the vessel's sides, and air ports are to be examined.

(8) Guard rails, gangways, and freeing ports are to be examined.

(c) *Correction of deficiencies.* Any such structure or parts or fittings of the vessel as are found to be in an unsatisfactory condition are to be rebuilt or repaired or renewed in order to place the vessel in a seaworthy condition so as to be eligible for a load line certificate.

§ 45.01–40 *Annual load line inspection.* (a) A vessel having been marked as provided by this part, and the mark certified as correct, will be inspected at intervals of approximately 12 months in order to insure the maintenance in an effective condition of the fittings and appliances for the:

(1) Protection of openings,

(2) guard rails,

(3) freeing ports,

(4) means of access to crew's quarters, and that there have not been alterations made to the hull or superstructures which would affect the calculations determining the position of the load lines.

(b) If upon examination the fittings and appliances are found to be in a satisfactory condition, the load line certificate will be endorsed to this effect. If it shall be found that alterations have been made to the hull or superstructures that affect the calculations determining the position of the load line, the matter shall be reported to the Commandant, U. S. Coast Guard for appropriate action.

(c) The assigning authority shall make this inspection and report thereon to the owners of the vessel, and a copy of such report shall be forwarded to the Commandant, U. S. Coast Guard, Washington 25, D. C.

§ 45.01–45 *Application for assignment, renewal, and certification of load line marks.* (a) Application for assignment and certification of load line marks or for renewal of load line certificates shall be made in writing to the assigning authority by the owners of the vessel.

§ 45.01–50 *Application for annual load line inspections.* (a) Application for annual load line inspection required by § 45.01–40 shall be made in writing to the assigning authority by the owners of a vessel.

§ 45.01–55 *Equivalents.* (a) Where in the regulations in this part it is provided that a particular fitting or appliance, or type thereof, shall be fitted or carried in a vessel, or that any particular arrangement shall be adopted, there may be substituted any other fitting or appliance or type thereof, or any other arrangement: *Provided,* That such fitting, appliance, or arrangement shall be considered a suitable equivalent by the assigning authority and the approval of the Commandant, U. S. Coast Guard for such substitution shall have been issued.

§ 45.01–60 *Validity of certificates; renewal of certificates.* (a) As the assignment of load lines is conditioned upon the structural efficiency of the vessel and upon the provision of effective protection to vessel and crew, every vessel required to be marked by the Coastwise Load Line Act, 1935, with load lines shall be surveyed by the assigning authority at least once in each 6 years to determine that the load lines are then correctly placed as required by this part. If the load line mark be found correct for the vessel in the condition she is then in, the certificate shall be renewed for such time as the condition of the vessel then warrants, but in no case for a longer period than 6 years and the facts shall be attested by indorsement upon the back of the certificate in the form shown in § 45.20–80.

(b) The Commandant, U. S. Coast Guard, shall be notified of every renewal indorsement and the date of its expiration.

(c) Foreign vessels which have not been exempted pursuant to section 5 of the Load Line Act shall have their load line certificate limited to a period of 1 year. The certificate may be validated for additional 1-year periods (provided, after survey, the condition of the vessel is found to warrant such validation, and the facts are attested by endorsement upon the back of the load line certificate by a surveyor of the American Bureau of Shipping or of the classification society issuing the certificate.) The certificate will become void 5 years from date of issue, or at the expiration of the fourth yearly validation, whichever occurs first.

§ 45.01–65 *Form of certificate.* (a) The forms for certificates certifying to the correctness of the load line mark as required by the Coastwise Load Line Act, 1935, as shown in § 45.20–80.

§ 45.01–70 *Cancellation of load line certificate.* (a) Notwithstanding the marking of a load line and the issuance of a load line certificate, the certificate will be cancelled if:

(1) The annual load line inspection required by § 45.01–40 has not been carried out or that the items described under § 45.01–40 are not maintained in an effective condition; or

(2) The survey required by § 45.01–35 has not been carried out, or that any defects disclosed by the survey have not been corrected; or

(3) Due to any cause the conditions of assignment have not been maintained as provided by the regulations in this part, or alterations have been made to hull or superstructures which affect the calculations made to determine the location of the load line.

§ 45.01–75 *Seasonal load lines.* (a) For load line purposes there is hereby established for the Great Lakes a winter, intermediate, and summer season, and load lines applicable to each season are established by the regulations in this part. The winter season shall be that period from November 1 through April 15 of the next year, the intermediate seasons from April 16 through May 15 and from September 16 through October 31, and the summer season from May 16 through September 15 (all dates inclusive).

(b) For those vessels that are marked and certificated with load lines under the International Load Line Convention, 1930, the load line marks shall be applicable to voyages on the Great Lakes in accordance with Table 45.01–75 (b).

TABLE 45.01–75 (b).

Load line mark, salt water	Season applicable
Tropical (T)...	May 16–Sept. 15 (Summer).
Summer (S)...	Apr. 16–May 15, Sept. 16–Oct. 31 (Intermediate).
Winter (W)...	Nov. 1–Apr. 15 (Winter).

(c) No vessel shall be loaded so as to submerge at any time the load line applicable to the season.

§ 45.01–80 *Log book entries.* (a) The master of a vessel subject to this part shall note in the vessel's log the data required by section 6 of the Coastwise Load Line Act, 1935 (49 Stat. 889; 46 U. S. C. 88e); that is, before departing from her loading port or place, the position of the load line mark, port and starboard, as applicable to the voyage and the actual drafts of the vessel forward and aft at the time of departing from port as nearly as the same can be ascertained.

§ 45.01–85 *Control.* (a) The Collector of Customs may detain a vessel for survey if he has reason to believe that the vessel is proceeding on her journey in excess of the draft allowed by the regulations in this part as indicated by the vessel's load line certificate, or otherwise. Immediately upon ordering a vessel detained, the Collector of Customs shall inform the Coast Guard District Commander thereof, who shall thereupon advise the collector whether or not he deems that the vessel may proceed to sea with safety. The Coast Guard District Commander may detain a vessel if it is so loaded as to be manifestly unsafe to proceed to sea, without advice thereof from the Collector of Customs. However, in such case, immediate notice of such detention shall be furnished the Collector of Customs so that clearance may be withheld.

(b) In the case of detention of a vessel, which shall be by written order, the detaining officer will immediately arrange for a survey in the manner prescribed by section 7 of the Coastwise Load Line Act, 1935 (49 Stat. 889; 46 U. S. C. 88f). In the case of such a survey, the detaining officer shall appoint three disinterested surveyors and, where practicable, one of them shall be from the Surveying Staff of the American Bureau of Shipping. Where such surveyors are appointed by the Collector of Customs, such appointments shall be with the approval of the Coast Guard District Commander. Whenever a vessel is detained the master may, within five days, appeal to the Commandant, U. S. Coast Guard, who may, if he desires, order a further survey and may affirm, set aside, or modify the order of the detaining officer.

(c) Where a foreign vessel is detained or any action is taken which would appear likely to result in legal proceedings being taken against such a vessel, the consul of the country to which the vessel belongs shall be informed as soon as possible of the circumstances of the case.

(d) Pursuant to the provisions of section 5 of the Coastwise Load Line Act, 1935 (49 Stat. 889; 46 U. S. C. 88d), as amended, it is hereby certified that a vessel of a foreign country which has ratified the International Load Line Convention, 1930, shall be deemed a vessel of a foreign country as described in section 5 of the cited act, and such a vessel shall be exempt from the provisions of this part insofar as the marking of the load lines and the certificating thereof are concerned, only so long as such country similarly recognizes the load lines established by the regulations in this part, for the purpose of a voyage by sea: *Provided,* That the vessel is marked with load lines and has on board a valid load line certificate certifying to the correctness of the mark, the vessel shall not be loaded beyond the limits allowed by the certificate, the position of the load line of the vessel shall correspond with the certificate, the hull and superstructure shall not have been so materially altered as to affect the calculations on which the load line was based, and alterations have not been made so that the protection of openings, guard rails, freeing ports, and means of access to crew's quarters, have made the vessel manifestly unfit to proceed to sea without danger to human life.

§ 45.01–90 *Approval of the Commandant.* (a) Where the active approval of the Commandant, U. S. Coast Guard is required in connection with this part, such information as will enable the Commandant, U. S. Coast Guard to obtain a comprehensive understanding of the question at issue shall be furnished and will remain with the Commandant, U. S. Coast Guard, as a record.

SUBPART 45.05—GENERAL RULES FOR DETERMINING MAXIMUM LOAD LINES OF MERCHANT VESSELS ON THE GREAT LAKES

NOTE: The rules necessarily assume that the nature and stowage of the cargo, ballast, etc., are such as to secure sufficient stability for the vessel.

§ 45.05–1 *Definitions*—(a) *Steamer.* (1) The term "steamer" or "steamship" includes all vessels having sufficient means for mechanical propulsion, except where provided with sufficient sail area for navigation under sails alone.

(2) A vessel fitted with mechanical means of propulsion and with sail area insufficient for navigation under sails alone may be assigned a load line under §§ 45.15–1—45.20–1.

(3) A lighter, barge, or other vessel without independent means of propulsion, when towed, is to be assigned a load line under §§ 45.15–1—45.20–1, except steel tank barges specially constructed for the carriage of liquids in bulk and cargo barges having only small access hatches in the freeboard deck, the load lines for which may be calculated under §§ 45.20–10—45.20–70.

(b) *Flush-deck vessel.* A flush-deck vessel is one which has no superstructure on the freeboard deck.

(c) *Superstructure.* A superstructure is a decked structure on the freeboard deck extending from side to side of the vessel. A raised quarter-deck is considered a superstructure.

(d) *Load line.* The load line is the line defining the maximum mean draft to which a vessel may be lawfully submerged. It is the lower limit of the freeboard as determined by the regulations in this part having regard to the various conditions and seasons.

(e) *Freeboard.* The freeboard assigned in the distance measured vertically downward at the side of the vessel amidships from the upper edge of the deck line to the upper edge of the load line.

(f) *Freeboard deck.* The freeboard deck is the deck from which the freeboard is measured, and is the uppermost complete deck having permanent means of closing all openings in weather portions of the deck in accordance with §§ 45.10–1—45.10–45. It is the upper deck in flush-deck vessels and vessels with detached superstructures. In vessels having discontinuous freeboard decks within superstructures which are not intact, or which are not fitted with class 1 closing appliances, the lowest line of the deck below the superstructure deck is taken as the freeboard deck.

(g) *Amidships.* Amidships is the middle of the length of the summer load water line, as defined in § 45.15–1.

CROSS REFERENCE: For class 1 closing appliances, see § 45.15–37.

§ 45.05–5 *Deck line.* (a) The deck line is a horizontal line 15 inches in length and 1 inch in breadth. It is to be marked amidships on each side of the

vessel, and its upper edge is to pass through the point where the continuation outward of the upper surface of the freeboard deck intersects the outer surface of the shell. (See fig. 45.05–5 (a).) Where the deck is partly sheathed amidships, the upper edge of the deck line is to pass through the point where the continuation outward of the upper surface of the actual sheathing at amidships intersects the outer surface of the shell.

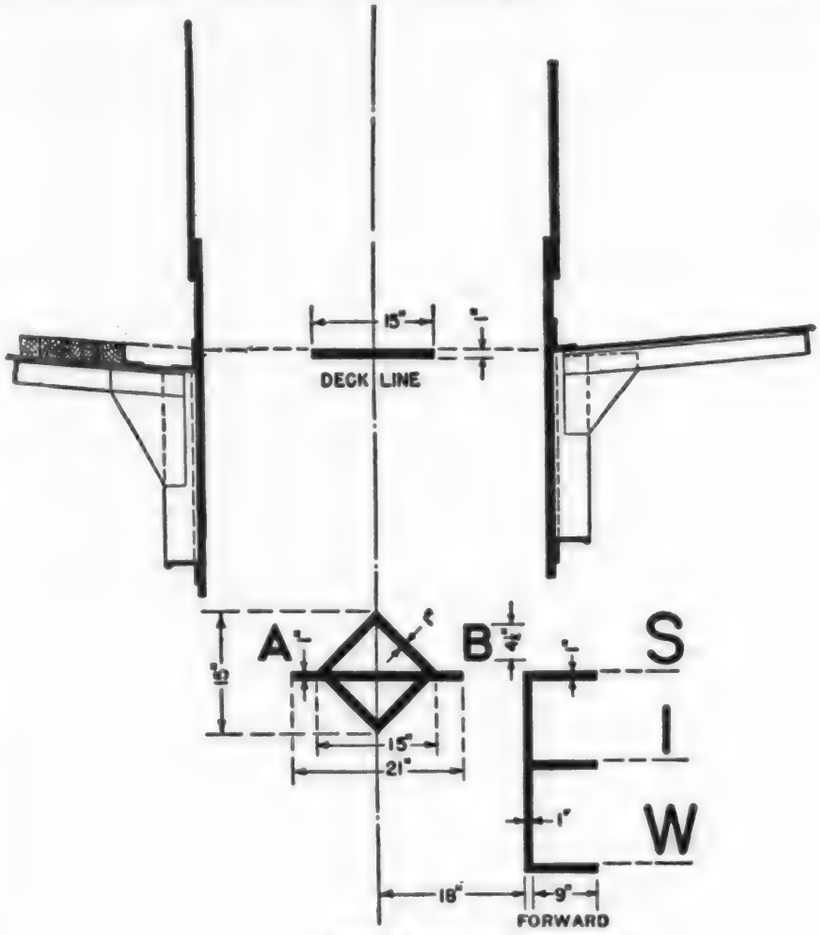


FIGURE 45.05–5 (a)

§ 45.05–10 *Load line diamond.* (a) The load line diamond is a square 15 inches on each diagonal with one diagonal vertical, the other horizontal, and is intersected by a horizontal line of 21 inches in length and 1 inch in breadth, the upper edge of which coincides with the horizontal diagonal of the diamond. The diamond is to be marked amidships below the deck line, port and starboard.

§ 45.05–15 *Lines to be used in connection with the diamond.* (a) The lines which indicate the maximum load line in different seasons are to be horizontal lines, 9 inches in length and 1 inch in breadth, which extend from and are at right angles to, a vertical line marked 18 inches forward of the center of the diamond. (See fig. 45.01–5.)

(b) The following are the lines to be used:

(1) *Summer load line.* The summer load line is indicated by the upper edge of the line which passes through the center of the diamond and also by a line marked "S."

(2) *Intermediate load line.* The intermediate load line is indicated by the upper edge of a line marked "I."

(3) *Winter load line.* The winter load line is indicated by the upper edge of a line marked "W."

(c) Where the draft is restricted on a basis of subdivision or stability and this draft is less than any of the various seasonal drafts permitted by the regulations in this part, the center of the diamond shall be located on the line of this restricted draft and it shall be applicable to all seasons. If such a permissible maximum draft comes between the seasonal markings, the seasonal markings below shall also be added.

§ 45.05–20 *Mark of assigning authority.* (a) The authority by whom the load lines are assigned may be indicated by letters measuring about 4½ by 3 inches marked alongside the diamond and above the center line.

§ 45.05–25 *Details of marking.* (a) The diamond, lines, and letters are to be painted, in white or yellow on a dark ground or in black on a light ground. They are also to be carefully cut in or center punched on the sides of iron and steel vessels, and on wood vessels they are to be cut into the planking for at least one eighth of an inch. The marks are to be plainly visible, and if necessary special arrangements are to be made for this purpose.

§ 45.05–30 *Verification of marks.* (a) The load line certificate is not to be delivered to the vessel until a surveyor of the assigning authority has certified that the marks are correctly and permanently indicated on the vessel's side.

SUBPART 45.10—CONDITIONS OF ASSIGNMENT OF LOAD LINES

§ 45.10–1 *Construction of vessel.* (a) The assignment of load lines is conditional upon the vessel being structurally efficient and upon the provision of effective protection to vessel and crew.

(b) Sections 45.10–1—45.10–100 apply to vessels to which minimum freeboards are assigned. In vessels to which greater freeboards than the minimum are assigned, the protection is to be relatively as effective.

(c) Passenger vessels—Subdivision and stability load lines: Where in passenger vessels the positions of the maximum load lines are determined by the application of subdivision and stability regulations as provided in Part 46 of this subchapter pertaining to passenger vessels on the Great Lakes, the provisions of the regulations in this part shall also be effective insofar as they are applicable.

§ 45.10–5 *Cargo and other hatchways not protected by superstructures.* (a) The construction and fittings of cargo and other hatchways in exposed positions on freeboard and superstructure decks are to be at least equivalent to the standards laid down in §§ 45.10–10—45.10–45.

§ 45.10–10 *Hatchway coamings.* (a) The minimum height of hatchway coamings on freeboard decks is to be at least 18 inches above the deck. The minimum height of coamings on superstructure decks is to be at least 18 inches above the deck if situated within a quarter of the vessel's length from the stem, and at least 12 inches if situated elsewhere.

§ 45.10–15 *Hatchway covers.* (a) On bulk freighters over 350 feet in length steel hatch covers are to be fitted to all exposed hatchways on the freeboard deck and they are to be of such thickness and provided with such stiffening as will enable them to be handled without deformation.

(b) Solid covers are to have stiffeners spaced not over 42 inches apart. The plating is to be not less than 0.24'' at 24-inch spacing and 0.36'' at 42-inch spacing with intermediate thicknesses at intermediate spacings. The stiffeners are not to be less effective than provided by angles, bulb angles or channels riveted or welded to the plate and having a section modulus in inches cubed not less than given by the formula:

$$I/y = S \times L^2 \times 0.025 \qquad (1)$$

where:

S = spacing of stiffeners in feet.
L = length in feet of the unsupported spans.
I = moment of inertia of the section.
y = distance from center of gravity of the section to the outermost strain fiber.

(c) Covers of the sliding plate type with flanges on one edge or with stiffeners riveted or welded to one edge shall have a sufficient number of sections so that when closed the spacing of the stiffeners does not exceed 42 inches. Plates are not to be less in thickness than required for solid steel covers in association with the spacing of the stiffeners when closed. The stiffening at the edge of the covers is not to be less effective than required above for solid covers. If hatch covers of the sliding plate type are used for spans exceeding 12'—1", additional support must be provided, the details of which will be specially considered.

(d) Where wood hatch covers are used they are to be made of long leaf yellow pine or fir and the finished thickness is not to be less than 2¼ inches in association with a span of 6 feet. The width of each bearing surface is to be at least 2½ inches.

§ 45.10–20 *Hatchway beams.* (a) Hatchways having wood covers are to be fitted with a system of main beams all extending in one direction or a system of main beams in association with auxiliary beams across the top of the main beams so arranged that the unsupported spans of the covers do not exceed 6 feet except where specially approved. The main beams may be of solid, rolled, or built shapes and the auxiliary beams may be either rolled shapes or timber of rectangular section. They are to have a section modulus in inches cubed of not less than given by the formula.

$$I/y = S \times L^2 \times C \qquad (1)$$

where:

S = the breadth of the area supported in feet.
L = the length of the unsupported spans in feet.
C = 0.03 for steel main beams where 18" coamings are required.
C = 0.025 for steel auxiliary beams where 18" coamings are required.
C = 0.025 for steel main beams where 12" coamings are required.
C = 0.02 for steel auxiliary beams where 12" coamings are required.
C = 0.15 for wood auxiliary beams where 18" coamings are required.
C = 0.12 for wood auxiliary beams where 12" coamings are required.
I = moment of inertia of the section.
y = distance from center of gravity of the section to the outermost strain fiber.

(b) Where rolled section beams are used the top flanges and the top angles in the case of built beams are to extend for the full length of the beams. Where wood auxiliary beams are used they are to be steel shod at all points where they bear on the main beams and at the ends.

§ 45.10–25 *Carriers or sockets.* (a) Carriers or sockets for hatchway beams and fore-and-afters are to be of steel at least one-half inch thick, and are to have a width of bearing surface of at least 3 inches.

§ 45.10–30 *Cleats and fasteners.* (a) Strong cleats at least 2½ inches wide or efficient clamping devices are to be fitted at intervals of approximately 2 feet from center to center; the end cleats are to be placed not more than 6 inches from each corner of the hatchway. Where steel sliding covers are fitted, patent fasteners of the "Mulholland type" or equal, spaced to suit the width of covers, may be used in place of cleats and wedges.

§ 45.10–35 *Battens and wedges.* (a) Battens, wedges, or tarpaulin securing devices are to be efficient and in good condition.

§ 45.10–40 *Tarpaulins.* (a) At least one tarpaulin in good condition, thoroughly waterproofed and of ample strength, is to be provided for each hatchway in an exposed position on freeboard and superstructure decks. The material is to be guaranteed free from jute, and shall not be less than No. 4 cotton canvas or equal before waterproofing.

§ 45.10–45 *Security of hatchway covers.* (a) At all hatchways in exposed positions on freeboard or superstructure decks suitable provision is to be made for securing the covers after the tarpaulins are battened down.

§ 45.10–50 *Cargo and other hatchways in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.* (a) The construction and fitting of such hatchways are to be at least equivalent to the standards laid down in § 45.10–55 (a).

§ 45.10–55 *Hatchway coamings and closing arrangements.* (a) Cargo, coaling, and other hatchways in the freeboard deck within superstructures which are fitted with class 2 closing appliances are to have coamings at least 9 inches in height and closing arrangements as effective as those required for exposed cargo hatchways.

(b) Where the closing appliances are less efficient than class 2, the hatchways are to have coamings at least 12 inches in height and are to have fittings and closing arrangements as effective as those required for exposed cargo hatchways.

(c) In the case of car ferries fitted with efficient "sea gates" extending above the freeboard deck at least to the height of a standard superstructure, coamings of less height may be fitted provided the hatches within superstructures are fitted with close fitting steel covers with efficient securing devices. When the openings in freeboard decks are not provided with closing devices the coamings are to extend above the freeboard deck at least to the height of a standard superstructure.

CROSS REFERENCE: For class 2 closing appliances, see § 45.15–40.

§ 45.10–57 *Machinery space openings in exposed positions on freeboard and raised quarter-decks.* (a) Such openings are to be properly framed and efficiently inclosed by steel casings of ample strength, and where the casings are not protected by other structures their strength is to be specially considered; doors in such casings are to be of steel, efficiently stiffened, permanently attached, and capable of being closed and secured from both sides. The sills of openings are to be at least 18 inches above the freeboard deck and 12 inches on a raised quarter-deck.

(b) Fiddley, funnel, and ventilator coamings are to be as high above the deck as is reasonable and practicable. Fiddley openings are to have strong steel covers permanently attached in their proper positions. Engine room skylights are to be of strong construction, preferably of steel.

§ 45.10–60 *Machinery space openings in exposed positions on superstructure decks other than raised quarter-decks.* (a) Such openings are to be properly framed and efficiently inclosed by strong steel casings. Doors in such cases are to be strongly constructed, permanently attached, and capable of being closed and secured from both sides. The sills of the openings are to be at least 9 inches above superstructure decks.

(b) Fiddley, funnel, and ventilator coamings are to be as high above the deck as is reasonable and practicable. Fiddley openings are to have strong steel covers permanently attached in their proper positions. Where the fiddley openings are more than 15 feet in height above the freeboard deck, covers need not be provided.

(c) Engine room skylights are to be of strong construction, preferably of steel.

§ 45.10–65 *Machinery space openings in the freeboard deck within superstructures which are fitted with closing appliances less efficient than class 1.* (a) Such openings are to be properly framed and efficiently inclosed by steel casings. Doors in such casings are to be strongly constructed, permanently attached, and capable of being securely closed. The sills of the openings are to be at least 6 inches above the deck where the superstructures are closed by class 2 closing appliances, and at least 12 inches above the deck where the closing appliances are less efficient than class 2.

CROSS REFERENCE: For class 2 closing appliances, see § 45.15–40.

§ 45.10–67 *Flush scuttles.* (a) Flush scuttles, where fitted, are to be of iron or steel, of substantial construction, with screw or bayonet joints.

§ 45.10–70 *Companionways.* (a) Companionways in exposed positions on freeboard decks and on decks of inclosed superstructures are to be of substantial construction. The sills of the doorways are to be 18 inches on freeboard decks and on superstructure decks within a quarter of the vessel's length from the stem and 12 inches on superstructure decks elsewhere. The doors are to be strongly constructed and capable of being closed and secured from both sides. Where the companionway is situated within a quarter of the vessel's length from the stem, it is to be of steel and riveted to the deck plating.

§ 45.10–75 *Ventilators in exposed positions on freeboard and superstructure decks.* (a) Such ventilators to spaces below freeboard decks or decks of superstructures which are intact or fitted with class 1 closing appliances are to have coamings of steel, substantially constructed, and efficiently connected to the deck. The deck plating at the base of the coamings is to be efficiently stiffened between the deck beams. The openings of ventilator coamings are to be pro-

vided with efficient closing arrangements.

(b) Where such ventilators are situated on the freeboard deck, or on the superstructure deck within a quarter of the vessel's length from the stem, and the closing arrangements are of a temporary character, the coamings are to be at least 30 inches in height; in other exposed positions on the superstructure deck they are to be at least 24 inches in height. Where the coaming of any ventilator exceeds 36 inches in height, it is to be specially supported and secured.

§ 45.10–77 *Air pipes.* (a) Where the air pipes to ballast and other tanks extend above the freeboard or superstructure decks, the exposed parts of the pipes are to be of substantial construction; the height from the deck to the opening is to be, when practical, at least 30 inches in wells on freeboard decks, 24 inches on raised quarter-decks, and 12 inches on other superstructure decks. Satisfactory means are to be provided for closing the openings of the air pipes. Where these heights may interfere with the working of the vessel a lower height may be approved provided the air pipe cap is properly protected and the air pipe is fitted with adequate means of closing.

§ 45.10–80 *Gangway, cargo, and coaling ports, etc.* (a) Openings in the sides of vessels below the freeboard deck are to be fitted with watertight doors or covers, which, with their securing appliances, are to be of sufficient strength.

§ 45.10–85 *Scuppers and sanitary discharge pipes.* (a) Discharges from scuppers and sanitary pipes led through the vessel's sides from spaces below the freeboard deck are to be fitted with efficient and accessible means for preventing water from passing inboard. Each separate discharge may have an automatic nonreturn valve with a positive means of closing it from a readily accessible position above the freeboard deck, or two automatic nonreturn valves without positive means of closing, provided the upper valve is situated so that it is always accessible for examination under service conditions. The positive-action valve is to be accessible and is to be provided with means for showing whether the valve is opened or closed.

(b) Conditional upon the type and the location of the inboard ends of such openings, similar provisions may be prescribed by the assigning authority as to discharge from spaces within inclosed superstructures.

(c) Where scuppers are fitted in superstructures not fitted with class 1 closing appliances they are to have efficient means for preventing the accidental admission of water below the freeboard deck.

§ 45.10–87 *Air ports.* (a) Air ports to spaces below the freeboard deck or to spaces below the superstructure deck of superstructures, closed by class 1 or class 2 closing appliances, are to be fitted with efficient inside deadlights permanently attached in their proper positions so that they can be effectively closed and secured watertight. Where, however, such spaces in superstructures are appropriated to passengers other than steerage passengers or to crew, the air ports may have portable deadlights stowed adjacent to the air ports, provided they are readily accessible at all times on service.

(b) The air ports and deadlights are to be of substantial and approved construction.

CROSS REFERENCE: For class 1 and class 2 closing appliances, see §§ 45.15–37, 45.15–40.

§ 45.10–90 *Guard rails.* (a) Efficient guard rails or bulwarks are to be fitted on all exposed portions of freeboard and superstructure decks.

§ 45.10–95 *Freeing ports.* (a) Where bulwarks on the weather portions of freeboard or superstructure decks form "wells" ample provision is to be made for rapidly freeing the decks of water and for draining them. The minimum freeing port area on each side of the vessel for each well on the freeboard deck and on the raised quarter-deck is to be that given by the following scale: The minimum area for each well on any other superstructure deck is to be one-half the area given by the scale. Where the length of the well exceeds .7*L*, the scale may be modified.

TABLE 45.10–95 (a)—SCALE OF FREEING PORT AREA

Length of bulwarks in "well" in feet	Freeing port area on each side in square feet	Length of bulwarks in "well" in feet	Freeing port area on each side in square feet
15	8.0	45	11.0
20	8.5	50	11.5
25	9.0	55	12.0
30	9.5	60	12.5
35	10.0	65	13.0
40	10.5	Above 65	(1)

[1] 1 square foot for each additional 5 feet length of bulwark.

(b) The lower edges of the freeing ports are to be as near the deck as practicable and preferably not higher than the upper edge of the gunwale bar. Two thirds of the freeing port area required is to be provided in the midship half of the well. In vessels with less than the standard sheer the freeing port area is to be suitably increased.

(c) All such openings in the bulwarks are to be protected by rails or bars spaced about 9 inches apart. If shutters are fitted to freeing ports, ample clearance is to be provided to prevent jamming. Hinges are to have brass pins.

§ 45.10–100 *Protection of crew.* Gangways, life lines, or other satisfactory means are to be provided for the protection of the crew in getting to and from their quarters.

SUBPART 45.15—LOAD LINES FOR STEAMERS [1]

§ 45.15–1 *Length (L).* (a) The length used with the rules and the freeboard tables is the length in feet on the summer load water line from the foreside of the stem to the afterside of the rudder post. Where there is no rudder post, the length is measured from the foreside of the stem to the axis of the rudder stock. For vessels with cruiser sterns, the length is to be taken as 96 percent of the total length on the designed summer load water line or as the length from the foreside of the stem to the axis of the rudder stock if that be the greater.

§ 45.15–5 *Breadth (B).* (a) The breadth is the maximum breadth in feet amidships to the molded line of the frame in iron or steel vessels and to the outside of the planking in wood or composite vessels.

§ 45.15–7 *Molded depth.* (a) The molded depth is the vertical distance in feet, measured amidships, from the top of the keel to the top of the freeboard deck beam at side. In wood and composite vessels the distance is measured from the lower edge of the keel rabbet. Where the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the depth is measured from the point where the line of the flat of the bottom continued inwards cuts the side of the keel.

§ 45.15–10 *Depth for freeboard (D).* (a) The depth used with the freeboard table is the molded depth plus the thickness of stringer plate, or plus

$$\frac{T(L-S)}{L} \qquad (1)$$

if that be greater, where

T is the mean thickness of the exposed deck clear of deck openings, and

S is the total length of superstructures as defined in § 45.15–60.

(b) Where the topsides are of unusual form, D is the depth of a midship section having vertical topsides, standard round of beam and area of topside section equal to that in the actual midship section. Where there is a step or break in the topsides (that is, as in the turret-deck vessel) 70 percent of the area above the step or break is included in the area used to determine the equivalent section.

(c) In a vessel without an enclosed superstructure covering at least 0.6*L* amidships, without a complete trunk or without a combination of intact partial superstructures and trunk extending all fore and aft, the depth to be used with the freeboard table is not to be less than *L*/15 in vessels below 350 feet in length, nor less than those tabulated below for lengths above 350 feet (minimum depths at intermediate lengths are obtained by interpolation).

TABLE 45.15–10 (a)—FREEBOARD TABLE

L	Minimum depth	L	Minimum depth	L	Minimum depth
350	23.35	450	27.65	550	30.20
375	24.70	475	28.40	575	30.70
400	25.80	500	29.05	600	31.15
425	26.80	525	29.65	625	31.60

[1] The provisions of §§ 45.01–1–45.01–90, inclusive, and §§ 45.05–1–45.10–100, inclusive, apply to all vessels having Great Lakes load lines and, for steamers, are supplemented by §§ 45.15–1–45.15–97, inclusive. Tankers having Great Lakes load lines are also subject to these requirements except as specifically modified in §§ 45.20–1–45.20–70, inclusive.

§ 45.15–15 *Coefficient of fineness (c).* (a) The coefficient of fineness used with the freeboard table is given by

$$c=\frac{\Delta}{L.B.d_1} \qquad (1)$$

Where Δ is the volume in cubic feet of the vessel's molded displacement excluding bossing at a mean molded draft d_1 which is 85 percent of the molded depth. The coefficient c is not to be taken as less than 0.68, nor more than 0.86.

§ 45.15–17 *Strength.* (a) The assigning authority is to be satisfied with the structural strength of vessels to which freeboards are assigned.

(b) Vessels which comply with the highest standard of the rules of a classification society recognized by the Commandant, U. S. Coast Guard, shall be regarded as having sufficient strength for the minimum freeboards allowed under Commandant, U. S. Coast Guard, in this part.

(c) Vessels which do not comply with the highest standard of the rules of a classification society recognized by the Commandant, U. S. Coast Guard, shall be assigned such increased freeboards as shall be determined by the assigning authority, and for guidance the following strength moduli are formulated:

(1) *Material.* The strength moduli are based on the assumption that the structure is built of mild steel, manufactured by the open-hearth process (acid or basic), and having a tensile strength of 60,000 to 72,000 pounds per square inch, and a minimum elongation on a length of 8 inches of at least

$$\frac{1{,}500{,}000}{\text{Tensile strength}}.$$

(2) *Strength deck.* The strength deck is the uppermost deck which is incorporated into and forms an integral part of the longitudinal girder within the half-length amidships.

(3) *Depth to strength deck (Ds).* The depth to strength deck is the vertical distance in feet amidships from the top of the keel to the top of the strength deck beam at side.

(4) *Draft (d).* The draft is the vertical distance in feet amidships from the top of the keel to the center of the diamond.

(5) *Longitudinal modulus.* The longitudinal modulus $\frac{I}{y}$ is the moment of inertia I of the midship section about the neutral axis divided by the distance y measured from the neutral axis to the top of the strength deck beam at side, calculated in way of openings but without deductions for rivet holes. Areas are measured in square inches and distances in feet.

(i) Below the strength deck, all continuous longitudinal members other than such parts of underdeck girders as are required entirely for supporting purposes are included. Above the strength deck, the gunwale-angle bar and the extension of the sheerstrake are the only members included.

(ii) The required longitudinal modulus for effective material is expressed by f. d. B., where f is the factor obtained from the Table 45.15–17 (c) (5) (ii).

TABLE 45.15–17 (c) (5) (ii)

L	f	L	f	L	
100	1.70	280	5.70	460	11.10
120	1.95	300	6.30	480	11.70
140	2.20	320	6.90	500	12.30
160	2.50	340	7.50	520	12.90
180	2.90	360	8.10	540	13.50
200	3.40	380	8.70	560	14.10
220	3.90	400	9.30	580	14.70
240	4.50	420	9.90	600	15.30
260	5.10	440	10.50	620	15.90

(iii) For intermediate lengths, the value of f is determined by interpolation.

(iv) This formula applies where the ratio $\frac{L}{D_s}$ does not exceed 13.5 in vessels of 325 feet length and under and 19 in vessels of 600 feet length and above. Intermediate values between lengths of 325 feet and 600 feet length are to be obtained by interpolation.

(6) *Frame.* For the purpose of the frame modulus, the frame is regarded as composed of a frame angle and a reverse angle each of the same size and thickness.

(7) *Frame modulus.* The modulus $\frac{I}{y}$ of the midship frame below the lowest tier of beams is the moment of inertia I of the frame section about the neutral axis divided by the distance y measured from the neutral axis to the extremity of the frame section, calculated without deduction for rivet and bolt holes. The modulus is measured in inch units.

The required frame modulus is expressed by

$$\frac{s\,(d-t)\,(f_1+f_2)}{1{,}000} \qquad (2)$$

where:

s is the frame spacing in inches.

t is the vertical distance in feet measured at amidships from the top of the keel to a point midway between the top of the inner bottom at side and the top of the heel bracket (see fig. 45.15–17 (c) (7) (i)); where there is no double bottom, t is measured to a point midway between the top of the floor at center and the top of the floor at the side.

f_1 is a coefficient depending on H, which, in vessels fitted with double bottoms, is the vertical distance in feet from the middle of the beam bracket of the lowest tier of beams at side to a point midway between the top of the inner bottom at side and the top of the heel bracket (see fig. 45.15–17 (c) (7) (i)); where there is no double bottom, H is measured to a point midway between the top of the floor at center and the top of the floor at side. Where the frame obtains additional strength from the form of the vessel, due allowance is made in the value of f_1.

f_2 is a coefficient depending on K which is the vertical distance in feet from the top of the lowest tier of beams at side to a point 7 feet, 6 inches above the freeboard deck at side, or, if there is a superstructure, to a point 12 feet 6 inches above the freeboard deck at side. (See fig. 45.15–17 (c) (7) (i).) The values of f_1 and f_2 are obtained from Table 45.15–17 (c) (7) (i).

TABLE 45.15–17 (c) (7) (i)

H in feet	0	7.0	9.0	11.0	13.0	15.0	17.0	19.0	21.0	23.0	25.0
f_1	9	11.0	12.5	15.0	19.0	24.0	29.5	36.0	43.0	51.0	59.0
K in feet	0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	.....	.....
f_2	0	.5	1.0	2.0	3.0	4.5	6.5	9.0	12.0	.....	.....

NOTE: Intermediate values are obtained by interpolation.

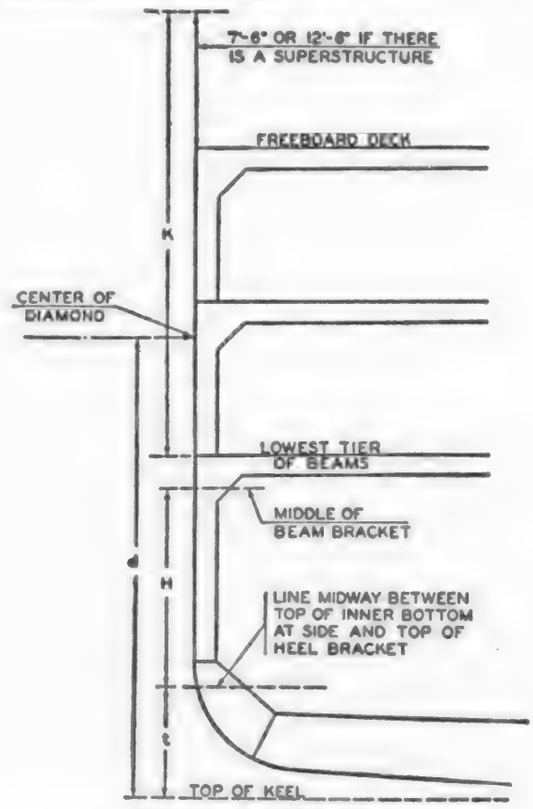

7'-6" OR 12'-6" IF THERE IS A SUPERSTRUCTURE
FREEBOARD DECK
K
CENTER OF DIAMOND
LOWEST TIER OF BEAMS
MIDDLE OF BEAM BRACKET
H
LINE MIDWAY BETWEEN TOP OF INNER BOTTOM AT SIDE AND TOP OF HEEL BRACKET
t
TOP OF KEEL

FIGURE 45.15–17 (c) (7) (i)

(ii) This formula applies where D is between 15 feet and 60 feet, both inclusive;

B is between $\frac{L}{10}+5$ and $\frac{L}{10}+20$, both inclusive;

$\frac{L}{Ds}$ is between 10 and 13.5, both inclusive; and the horizontal distance from the outside of the frame to the center of the first row of pillars does not exceed 20 feet.

(iii) In single-deck vessels of ordinary form, where H does not exceed 18 feet, the frame modulus determined by the preceding method is multiplied by the factor f_s where

$$f_s=0.50+0.05\ (H-8)$$

(iv) Where the horizontal distance from the outside of the frame to the center of the first row of pillars exceeds 20 feet, the assigning authority is to be satisfied that sufficient additional strength is provided.

§ 45.15–20 *Height of superstructure.* (a) The height of a superstructure is the least vertical height measured from the top of the superstructure deck to the top of the freeboard deck beams minus the difference between D and the molded depth. (See §§ 45.15–7, 45.15–10.)

§ 45.15–25 *Standard height of superstructure.* (a) The standard height of a raised quarter-deck is 3 feet for vessels up to and including 100 feet in length, 4 feet for vessels 250 feet in length, and 6 feet for vessels 400 feet in length and above. The standard height of any other superstructure is 6 feet for vessels up to and including 250 feet in length and 7 feet 6 inches for vessels 400 feet in length and above. The standard height at intermediate lengths is obtained by interpolation.

§ 45.15–27 *Length of superstructure (S).* (a) The length of a superstructure is the mean covered length of the parts of the superstructure which extend to the sides of the vessel and lie within lines drawn perpendicular to the extremities of the summer load water line, as defined in § 45.15–1.

§ 45.15–30 *Inclosed superstructure.* (a) A detached superstructure is regarded as inclosed only where:

(1) The inclosing bulkheads are of efficient construction. (See § 45.15–35.)

(2) The access openings in these bulkheads are fitted with class 1 or class 2 closing appliances. (See §§ 45.15–37, 45.15–40.)

(3) All other openings in sides or ends of the superstructure are fitted with efficient weather-tight means of closing.

(4) Independent means of access to crew, machinery, bunker, and other working spaces within bridges and poops are at all times available when the bulkhead openings are closed.

§ 45.15–35 *Superstructure bulkheads.* (a) Bulkheads at exposed ends of poops, bridges, and forecastles are deemed to be of efficient construction where the assigning authority is satisfied that, in the circumstances, they are equivalent to the following standard for vessels with minimum freeboards under which standard the stiffeners and plating are of the scantlings given in Table 45.15–35 (a), the stiffeners are spaced 30 inches apart, the stiffeners on poop and bridge front bulkheads have efficient end connections, and those on after bulkheads of bridges and forecastles extend for the whole distance between the margin angles of the bulkheads.

TABLE 45.15–35 (a).—EXPOSED BULKHEADS OF SUPERSTRUCTURES OF STANDARD HEIGHT [1]

Bridge front bulkheads, unprotected bulkheads of poops 0.4L or more in length		Bulkheads of poops partially protected or less in length than 0.4L		After bulkheads of bridges and forecastles	
Length of vessel (feet)	Bulb angle stiffeners (inches)	Length of vessel (feet)	Plain angle stiffeners (inches)	Length of vessel (feet)	Plain angle stiffeners (inches)
Under 160	5½ x 3 x 0.32.	Under 150	3 x 2½ x 5/16.	Under 150	2½ x 2¼ x ¼.
160	6 x 3 x 0.34.	150	3½ x 2½ x 5/16.	150	3½ x 2½ x ¼.
200	7 x 3 x 0.32.	200	4 x 3 x 5/16.	250	3½ x 3 x 5/16.
240	7 x 3 x 0.38.	250	5 x 3 x 5/16.	350 and above	4 x 3 x 5/16.
280	7 x 3 x 0.44.	300	5 x 3 x 3/8.		
320	8 x 3 x 0.40.	350	6 x 3½ x 3/8.		
360	8 x 3 x 0.46.	400	6 x 3½ x 7/16.		
400	9 x 3½ x 0.38.	450	7 x 3½ x 7/16.		
440	9 x 3½ x 0.50.	500 and above	7 x 3½ x ½.		
480	10 x 3½ x 0.40.				
520	10 x 3½ x 0.52.				
560 and above	10 x 3½ x 0.64.				

Length of vessel (feet)	Bulkhead plating (inch)	Length of vessel (feet)	Bulkhead plating (inch)	Length of vessel (feet)	Bulkhead plating (inch)
200 and under	0.3	160 and under	0.24	160 and under	0.20
380 and above	0.44	400 and above	0.38	400 and above	0.30

[1] For vessels intermediate in length the thickness of bulkhead plating is obtained by interpolation.

§ 45.15–37 *Class 1 closing appliances.* (a) These appliances are of iron or steel, are in all cases to be permanently and strongly attached to the bulkhead, are framed, stiffened, and fitted so that the whole structure is of equivalent strength to the unpierced bulkhead, and are weather tight when closed. The means for securing these appliances are permanently attached to the bulkhead or to the appliances and the latter are so arranged that they can be closed and secured from both sides of the bulkhead or from the deck above. The sills of the access openings are at least 12 inches above the deck.

§ 45.15–40 *Class 2 closing appliances.* (a) These appliances are (1) strongly framed hardwood hinged doors, which are not more than 30 inches wide nor less than 2 inches thick, or (2) shifting boards fitted for the full height of the opening in channels riveted to the bulkhead, the shifting boards being at least 2 inches thick where the width of opening is 30 inches or less, and increased in thickness at the rate of 1 inch for each additional 15 inches of width, or (3) portable plates of equal efficiency.

§ 45.15–45 *Temporary closing appliances.* (a) Temporary closing appliances for middle line openings in the deck of an inclosed superstructure consists of: (1) a steel coaming not less than 9 inches in height efficiently rivited to the deck; (2) hatchway covers as required by § 45.10–15, secured by hemp lashings; and (3) hatchway supports as required by §§ 45.10–20, 45.10–25.

§ 45.15–47 *Superstructures, general.* (a) Where exposed bulkheads at the ends of poops, bridges, and forecastles are not of efficient construction (see § 45.15–35), they are considered as nonexistent.

(b) Where in the side plating of a superstructure there is an opening not provided with permanent means of closing, the part of the superstructure in way of the opening is regarded as having no effective length.

(c) Where the height of a superstructure is less than the standard its length is reduced in the ratio of the actual to the standard height. Where the height exceeds the standard, no increase is made in the length of the superstructure.

§ 45.15–50 *Poop.* (a) Where there is an efficient bulkhead and the access openings are fitted with class 1 closing appliances, the length to the bulkhead is effective. Where the access openings in an efficient bulkhead are fitted with class 2 closing appliances and the length to the bulkhead is 0.5 L or less, 100 percent of that length is effective; where the length is 0.7 L or more, 90 percent of that length is effective; where the length is between 0.5 L and 0.7 L, an intermediate percentage of that length is effective; where an allowance is given for an efficient adjacent trunk (see § 45.15–65), 90 percent of the length to the bulkhead is to be taken as effective; 50 percent of the length of an open poop or of an open extension beyond an efficient bulkhead is effective.

CROSS REFERENCE: For class 2 closing appliances, see § 45.15–40.

§ 45.15–55 *Raised quarter deck.* (a) Where there is an efficient intact bulkhead, the length to the bulkhead is effective. Where the bulkhead is not intact, the superstructure is considered as a poop of less than standard height.

§ 45.15–57 *Bridge.* (a) Where there is an efficient bulkhead at each end, and the access openings in the bulkheads are fitted with class 1 closing appliances, the length between the bulkheads is effective.

(b) Where the access openings in the forward bulkhead are fitted with class 1 closing appliances and the access openings in the after bulkhead with class 2 closing appliances, the length between

the bulkheads is effective; where an allowance is given for an efficient trunk, adjacent to the after bulkhead (see § 45.15–65), 90 percent of the length is effective. Where the access openings in both bulkheads are fitted with class 2 closing appliances, 90 percent of the length between the bulkheads is effective. Where the access openings in the forward bulkhead are fitted with class 1 or class 2 closing appliances and the access openings in the after bulkhead have no closing appliances, 75 percent of the length between the bulkheads is effective. Where the access openings in both bulkheads have no closing appliances, 50 percent of the length is effective; 75 percent of the length of an open extension beyond the after bulkhead and 50 percent of that beyond the forward bulkhead are effective.

CROSS REFERENCE: For class 1 and class 2 closing appliances, see §§ 45.15–37, 45.15–40.

§ 45.15–60 *Forecastle.* (a) Where there is an efficient bulkhead and the access openings are fitted with class 1 or class 2 closing appliances, the length to the bulkhead is effective. Where no closing appliances are fitted and the sheer forward of amidships is not less than the standard sheer, 100 percent of the length of the forecastle forward of 0.1 *L* from the forward perpendicular is effective; where the sheer forward is half the standard sheer or less, 50 percent of that length is effective; and where the sheer forward is intermediate between the standard and half the standard sheer, an intermediate percentage of that length is effective; 50 percent of the length of an open extension beyond the bulkhead or beyond 0.1 *L* from the forward perpendicular is effective.

CROSS REFERENCE: For class 1 and 2 closing appliances, see §§ 45.15–37, 45.15–40.

§ 45.15–65 *Trunk.* (a) A trunk or similar structure which does not extend to the sides of the vessel is regarded as efficient, *Provided,* That:

(1) The trunk is at least as strong as a superstructure;

(2) The hatchways are in the trunk deck, and comply with the requirements of §§ 45.10–1—45.10–45, and the width of the trunk deck stringer provides a satisfactory gangway and sufficient lateral stiffness;

(3) A permanent working platform fore and aft fitted with guard rails is provided by the trunk deck, or by detached trunks connected to other superstructures by efficient permanent gangways. On tank barges an efficient life line may be accepted in lieu of guard rails;

(4) Ventilators are protected by the trunk, by watertight covers, or by equivalent means;

(5) Open rails are fitted on the weather portions of the freeboard deck in way of the trunk for at least half their length;

(6) The machinery casings are protected by the trunk, by a superstructure of standard height, or by a deck house of the same height and of equivalent strength.

(b) Where access openings in poop and bridge bulkheads are fitted with class 1 closing appliances, 100 percent of the length of an efficient trunk reduced in the ratio of its mean breadth to *B* is added to the effective length of the superstructures. Where the access openings in these bulkheads are not fitted with class 1 closing appliances 90 percent is added.

(c) The standard height of a trunk is the standard height of a bridge.

(d) Where the height of the trunk is less than the standard height of a bridge, the addition is reduced in the ratio of the actual to the standard height; where the height of hatchway coamings on the trunk deck is less than the standard height of coamings (see § 45.15–10), a reduction from the actual height of trunk is to be made which corresponds to the difference between the actual and the standard height of coamings.

§ 45.15–67 *Inclosed superstructure with middle line openings in the deck not provided with permanent means of closing.* (a) Where there is an inclosed superstructure with one or more middle line openings in the deck not provided with permanent means of closing (see §§ 45.10–1—45.10–45), the effective length of the superstructure is determined as follows:

(1) Where efficient temporary closing appliances are not provided for the middle line deck openings (see §§ 45.15–45), or the breadth of opening is 80 percent or more of the breadth B_1 of the superstructure deck at the middle of the opening, the vessel is considered as having an open well in way of each opening, and freeing ports are to be provided in way of this well. The effective length of superstructure between openings is governed by §§ 45.15–50, 45.15–57, 45.15–60.

(2) Where efficient temporary closing appliances are provided for middle line deck openings and the breadth of opening is less than 0.8 B_1, the effective length is governed by §§ 45.15–50, 45.15–57, 45.15–60, except that where access openings in 'tween deck bulkheads are closed by class 2 closing appliances, they are regarded as being closed by class 1 closing appliances in determining the effective length. The total effective length is obtained by adding to the length determined by subparagraph (a) (1) of this section the difference between this length and the length of the vessel modified in the ratio of

$$\frac{B_1-b}{B_1}$$ where b=breadth of deck opening

where

$$\frac{B_1-b}{B_1}$$ is greater than 0.5 it is taken as 0.5.

§ 45.15–70 *Deductions for superstructures.* (a) Where the effective length of superstructures is 1.0 *L*, the deduction from the freeboard is 14 inches at 80 feet length of vessel, 34 inches at 280 feet length, and 42 inches at 400 feet length and above; deductions at intermediate lengths are obtained by interpolation. Where the total effective length of superstructures is less than 1.0 *L*, the deduction is a percentage obtained from Table 45.15–70 (a).

TABLE 45.15–70 (a)—TOTAL EFFECTIVE LENGTH OF SUPERSTRUCTURE (E)

Superstructures	0	0.1*L*	0.2*L*	0.3*L*	0.4*L*	0.5*L*	Line
	Per-cent	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	
All types with forecastle and without detached bridge	0	5	10	15	23.5	32	A
All types with forecastle and detached bridge [1]	0	6.3	12.7	19	27.5	36	B

Superstructures	0.6*L*	0.7*L*	0.8*L*	0.9*L*	1.0*L*	Line
	Per-cent	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	
All types with forecastle and without detached bridge	46	63	75.3	87.7	100	A
All types with forecastle and detached bridge [1]	46	63	75.3	87.7	100	B

[1] Where the effective length of a detached bridge is less than 0.2*L* the percentages are obtained by interpolation between lines B and A. Where no forecastle is fitted the above percentages are reduced by 5. Percentages for intermediate lengths of superstructures are obtained by interpolation.

§ 45.15–73 *Sheer, general.* (a) The sheer is measured from the deck at side to a line of reference drawn parallel to the keel through the sheer line at amidships.

(b) In vessels designed to trim by the stern in service, the sheer may be measured in relation to the load line, provided an additional mark is placed at 0.25*L* forward of amidships to indicate the assigned load line. This mark is to be similar to the load line diamond amidships.

(c) In flush deck vessels and in vessels with detached superstructures the sheer is meaured at the freeboard deck.

(d) In vessels with topsides of unusual form in which there is a step or break in the topsides, the sheer is considered in relation to the equivalent depth amidships (see § 45.15–10).

(e) In vessels with a superstructure of standard height which extends over the whole length of the freeboard deck, the sheer is measured at the superstructure deck; where the height exceeds the standard, the sheer may be considered in relation to the standard height.

(f) Where a superstructure is intact or access openings in its inclosing bulkheads are fitted with class 1 closing appliances, and the superstructure deck has at least the same sheer as the exposed freeboard deck, the sheer of the enclosed portion of the freeboard deck is not taken into account.

CROSS REFERENCE: For class 1 closing appliances, see § 45.15–37.

§ 45.15–75 *Standard sheer profile.* (a) The ordinates (in inches) of the standard sheer profile are given in Table 45.15–75

(a) where L is the number of feet in the length of the vessel.

TABLE 45.15-75 (a)

Station [1]	Ordinate	Factor
A. P.	0.1 L+10	1
1/6L from A. P.	0.0445 L+4.45	4
1/3L from A. P.	0.011 L+1.1	2
Amidships	+0	4
1/3L from F. P.	0.022 L+2.2	2
1/6L from F. P.	0.089 L+8.9	4
F. P.	0.2 L+20	1

[1] A. P. = After end of summer load water line. F. P. = Fore end of summer load water line.

§ 45.15-77 *Measurement of variations from standard sheer profile.* (a) Where the sheer profile differs from the standard, the 7 ordinates of each profile are multiplied by the appropriate factors given in the table of ordinates. The difference between the sums of the respective products, divided by 18, measures the deficiency or excess of sheer. Where the after half of the sheer profile is greater than the standard and the forward half is less than the standard, no credit is allowed for the part in excess and the deficiency only is measured.

(b) Where the forward half of the sheer profile exceeds the standard, and the after portion of the sheer profile is not less than 75 percent of the standard, credit is allowed for the part in excess; where the after part is less than 50 percent of the standard no credit is given for the excess sheer forward. Where the after sheer is between 50 percent and 75 percent of the standard, intermediate allowances may be granted for excess sheer forward.

§ 45.15-80 *Correction for variations from standard sheer profile.* (a) The correction for sheer is the deficiency or excess of sheer (see § 45.15-77) multiplied by $0.75-\frac{S}{2L}$ where S is the total length of the superstructure, as defined in § 45.15-27.

§ 45.15-83 *Addition for deficiency in sheer.* (a) Where the sheer is less than the standard, the correction for deficiency in sheer (see § 45.15-80) is added to the freeboard.

§ 45.15-85 *Deduction for excess sheer.* (a) Where an enclosed superstructure covers 0.1L before and 0.1L abaft amidships, the correction for excess of sheer (see § 45.15-80) is deducted from the freeboard; in vessels with detached superstructures where no enclosed superstructure covers amidships, no deduction is made from the freeboard, where an enclosed superstructure covers less than 0.1L before and 0.1L abaft amidships, the deduction is obtained by interpolation. The maximum deduction for excess sheer is 1½ inches at 100 feet and increases at the rate of 1½ inches for each additional 100 feet in the length of the vessel.

§ 45.15-87 *Standard round of beam.* (a) The standard round of beam of the freeboard deck is one-fiftieth of the breadth of the vessel.

§ 45.15-90 *Round of beam correction.* (a) Where the round of beam of the freeboard deck is greater or less than the standard, the freeboard is decreased or increased respectively by one-fourth of the difference between the actual and the standard round of beam, multiplied by the proportion of the length of the freeboard deck not covered by enclosed superstructures. Twice the standard round of beam is the maximum for which allowance is given.

§ 45.15-93 *Summer freeboard.* (a) The minimum freeboard in summer is the freeboard derived from the freeboard table after corrections for departures from the standards and after deduction for superstructures. The freeboard measured from the intersection of the upper surface of the freeboard deck with the outer surface of the shell is not to be less than 2 inches.

§ 45.15-95 *Intermediate and winter freeboard.* (a) The minimum freeboards for the intermediate and winter seasons is obtained by an addition to the summer freeboard of a distance in inches obtained by multiplying the factors given in Table 45.15-95 (a) by the summer draft in feet measured from the top of the keel to the center of the diamond.

TABLE 45.15-95 (a)

Length between perpendiculars [1]	Factor for intermediate season	Factor for winter season
Under 400 feet	0.25	0.50
450 feet	.25	.65
500 feet	.35	.80
550 feet and above	.45	1.00

[1] Factors for intermediate lengths to be obtained by interpolation.

§ 45.15-97 *Freeboard table for steamers.* (a) Table 45.15-97 (a) gives the basic minimum summer freeboard for steamers which comply with the standards in this part.

TABLE 45.15-97 (a).—BASIC MINIMUM SUMMER FREEBOARD FOR STEAMERS

L (feet)	Freeboard	L (feet)	Freeboard	L (feet)	Freeboard
	Inches		*Inches*		*Inches*
80	7.2	270	33.8	460	84.5
90	8.0	280	35.8	470	87.5
100	8.9	290	37.8	480	90.5
110	9.9	300	40.0	490	93.4
120	11.0	310	42.2	500	96.3
130	12.1	320	44.6	510	99.1
140	13.3	330	47.0	520	101.9
150	14.5	340	49.5	530	104.7
160	15.7	350	52.1	540	107.4
170	17.1	360	54.8	550	110.0
180	18.5	370	57.6	560	112.6
190	19.9	380	60.5	570	115.1
200	21.4	390	63.4	580	117.6
210	23.0	400	66.4	590	120.0
220	24.6	410	69.4	600	122.3
230	26.3	420	72.4	610	124.5
240	28.1	430	75.4	620	126.7
250	29.9	440	78.5		
260	31.8	450	81.5		

(b) The freeboards at intermediate lengths are obtained by interpolation.

(c) Where c exceeds 0.68, the freeboard is multiplied by the factor

$$\frac{c+0.68}{1.36}$$

(d) Where D *exceeds or is less than* $\frac{L}{15}$ the freeboard is increased or decreased accordingly, by $\left(D-\frac{L}{15}\right)R$ inches, where R is $\frac{L}{130}$ at lengths less than 390 feet, and 3 at 390 feet length and above, except that the depth to be used in the above correction is not to be taken at less than $L/15$ in vessels below 350 feet in length, nor less than those given in Table 45.15-97 (d), for lengths 350 feet and above. Minimum depths at intermediate lengths are obtained by interpolation.

TABLE 45.15-97 (d)

L	Minimum depth	L	Minimum depth	L	Minimum depth
350	23.35	450	27.65	550	30.20
375	24.70	475	28.40	575	30.70
400	25.80	500	29.05	600	31.15
425	26.80	525	29.65	625	31.60

(1) *Provided, however,* a vessel with an enclosed superstructure covering at least 0.6 L amidships with a complete trunk or with a combination of intact partial superstructures and trunk which extends all fore and aft, where D is less than $L/15$, the freeboard is reduced at the above rate. Where the height of superstructures or trunk is less than the standard height, the reduction is in the ratio of the actual to the standard height.

(e) Where the actual depth to the surface of the freeboard deck amidships is greater or less than D, the difference between the depths (in inches) is added to or deducted from the freeboard.

SUBPART 45.20—LOAD LINES FOR TANKERS [1]

§ 45.20-1 *Definition.* (a) The term "tanker" includes all steamers specially constructed for the carriage of liquid cargoes in bulk.

§ 45.20-5 *Marks on sides.* (a) The marks on the tanker's sides are to be as shown by the figure in § 45.05-15.

§ 45.20-10 *Construction.* (a) The structure of the vessel is to be of sufficient strength for the increased draft corresponding to the freeboard assigned.

§ 45.20-15 *Forecastle.* (a) The vessel is to have a forecastle of which the length is not less than 7 percent of the length of the vessel and the height is not less than the standard height.

(b) A forecastle is not required in the case of self-propelled barges, tank barges, and cargo barges carrying cargo only on deck.

§ 45.20-20 *Machinery casings.* (a) The openings in machinery casings on the freeboard deck are to be fitted with steel doors. The casings are to be protected by an enclosed poop or bridge of at least standard height, or by a deck house of equal height and of equivalent strength. These conditions may be modified in the case of self-propelled barges. The bulkheads at the ends of these structures are to be of the scantlings required for bridge front bulkheads. All entrances to the structures from the freeboard deck are to be fitted with effective closing appliances, and the sills are to be at least 18 inches above the deck. Exposed machinery casings on the

[1] The provisions of §§ 45.01-1—45.01-90, inclusive, and §§ 45.05-1—45.15-97, inclusive, shall apply to Great Lakes tankers except as they are modified by §§ 45.20-1—45.20-70, inclusive.

superstructure deck are to be of substantial construction, and all openings in them are to be fitted with steel closing appliances permanently attached to the casings and capable of being closed and secured from both sides; the sills of such openings are to be at least 15 inches above the deck. Fiddley openings are to be as high above the superstructure deck as is reasonable and practicable and are to have strong steel covers permanently attached in their proper positions. Engine room skylights are to be of substantial construction, fitted with strong glass lights, which may be required to be fitted with steel covers depending on their height above the freeboard deck.

§ 45.20–25 *Gangway.* (a) An efficiently constructed permanent gangway of sufficient strength for its exposed position is to be fitted fore and aft at the level of the superstructure deck between the poop and midship bridge, and when crew are berthed forward from the bridge to the forecastle, or other equivalent means of access may be provided to carry out the purpose of the gangway, such as passage below deck.

(b) On towed tank barges a wire cable arranged and equipped to facilitate safe communication between both ends of the vessel at all times may be accepted in lieu of a permanent gangway.

§ 45.20–30 *Protection of crew, access to machinery space, etc.* (a) Safe and satisfactory access from the gangway level to the quarters of the crew, the machinery space, and all other parts used in the necessary work of the vessel is to be available at all times. This section does not apply to pump rooms entered from the freeboard deck, when fitted with class 1 closing appliances. Deck houses for the accommodation of the crew, pilothouses, etc., on the freeboard deck are to be of steel efficiently constructed and provided with port lights fitted with steel dead lights.

§ 45.20–35 *Hatchways.* (a) All hatchways on the freeboard deck and on the deck of expansion trunks are to be closed watertight by efficient steel covers.

§ 45.20–40 *Ventilators.* (a) Ventilators to spaces below the freeboard deck are to be of ample strength or are to be protected by superstructures or equally efficient means.

§ 45.20–45 *Freeing arrangements.* (a) Vessels with bulwarks are to have open rails fitted for at least half the length of the exposed portion of the weather deck or other effective freeing arrangements. The upper edge of the sheer strake is to be kept as low as practicable and preferably not higher than the upper edge of the gunwale bar.

(b) Where superstructures are connected by trunks, open rails are to be fitted for the whole length of the weather portions of the freeboard deck.

§ 45.20–50 *Plans.* (a) Plans showing proposed fittings and arrangements are to be submitted to the assigning authority for approval.

§ 45.20–55 *Computation of freeboard.* (a) When the assigning authority is satisfied that the foregoing requirements are fulfilled, the summer freeboard may be computed from the table for tankers; all corrections, except those for flush-deck steamers, detached superstructures, and excess sheer, are to be made in accordance with §§ 44.15–1—45.20–1.

§ 45.20–60 *Deductions for detached superstructures.* (a) When the total effective length of superstructure is less than 1.0 *L*, the deduction is a percentage of that for a superstructure of length 1.0 *L*, and is obtained from Table 45.20–60 (a).

TABLE 45.20–60 (a).—TOTAL EFFECTIVE LENGTH OF SUPERSTRUCTURES

	0	0.1*L*	0.2*L*	0.3*L*	0.4*L*	0.5*L*	0.6*L*	0.7*L*	0.8*L*	0.9*L*	1.0*L*
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
All types	0	7	14	21	31	41	52	63	75.3	87.7	100

§ 45.20–65 *Deduction for excess sheer.* (a) Where the sheer is greater than the standard, the correction for excess sheer (see § 45.15–80) is deducted from the freeboard for all tankers. Section 45.15–85 does not apply except that the maximum deduction for excess sheer is 1½ inches at 100 feet and increases at the rate of 1½ inches for each additional 100 feet in the length of the vessel.

§ 45.20–70 *Freeboard table for tankers.* (a) Table 45.20–70 (a) gives the basic minimum summer freeboard for tankers which comply with the standards in this part.

TABLE 45.20–70 (a)—BASIC MINIMUM SUMMER FREEBOARD FOR TANKERS

L (feet)	Freeboard	*L* (feet)	Freeboard	*L* (feet)	Freeboard
	Inches		*Inches*		*Inches*
80	6.4	220	22.8	360	48.5
90	7.2	230	24.3	370	50.6
100	8.1	240	25.9	380	52.7
110	9.1	250	27.5	390	54.9
120	10.1	260	29.2	400	57.1
130	11.1	270	30.9	410	59.4
140	12.2	280	32.7	420	61.7
150	13.3	290	34.5	430	64.1
160	14.5	300	36.4	440	66.5
170	15.8	310	38.3	450	69.0
180	17.1	320	40.2	460	71.5
190	18.5	330	42.2	(1)	
200	19.9	340	44.3		
210	21.3	350	46.4		

[1] Tankers above 460 feet in length to be specially considered, and the assigned freeboards are to be approved by the Commandant, U. S. Coast Guard, before issuance of certificate.

§ 45.20–75 *Fees; travel expense.*—(a) *Scale of fees.* Table 45.20–75 (a) gives the scale of maximum fees payable by owner for assignment of load line (including load line and condition survey, verification of markings, and issuance of load line certificate).

TABLE 45.20–75 (a).—SCALE OF MAXIMUM FEES

	Classed vessels	Unclassed vessels
Under 500 gross tons	$30.00	$90.00
500 and under 1,000 gross tons	35.00	105.00
1,000 and under 2,000 gross tons	40.00	125.00
2,000 and under 3,000 gross tons	50.00	150.00
3,000 and under 4,000 gross tons	60.00	175.00
4,000 and under 5,000 gross tons	70.00	200.00
5,000 and under 6,000 gross tons	80.00	220.00
6,000 and under 7,000 gross tons	90.00	240.00
7,000 and under 8,000 gross tons	100.00	260.00
8,000 and under 10,000 gross tons	110.00	280.00
10,000 and under 12,000 gross tons	120.00	300.00
12,000 gross tons and above	130.00	320.00

(b) *Fees for renewal of load line certificate.* The maximum fees for condition survey and renewal of load line certificate shall be 50 percent of the above scale. In the case of an American Bureau classed vessel no charge will be made for this survey if carried out in conjunction with a special periodical survey required for maintenance of class and for which a fee is chargeable.

(c) *Fee for annual load line inspection.* The fee for annual load line inspection shall be $25. In the case of a vessel classed by the American Bureau of Shipping, no charge will be made for this inspection if carried out at the same time as a survey to the hull that is required by the rules of the American Bureau of Shipping for maintenance of class and for which a fee is chargeable.

(d) *Traveling expenses.* All traveling expenses incurred in connection with the above surveys will be an additional charge.

§ 45.20–80 *Form of load line certificate.*

LOAD LINE CERTIFICATE FOR THE GREAT LAKES

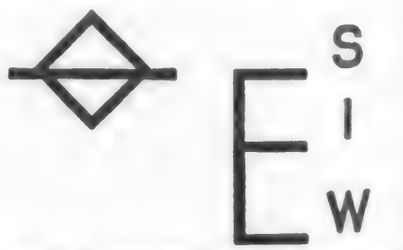
[SEAL]

Issued under the authority of the Commandant, U. S. Coast Guard, United States of America, under the provisions of the act of August 27, 1935, as amended, to establish load lines for American merchant vessels of 150 gross tons or over engaged in trade on the Great Lakes of North America.

Ship _____ Official No. _____
Port of registry _____
Gross tonnage _____

FREEBOARD FROM DECK LINE	LOAD LINE
Summer _____	S _____
Intermediate _____	I _____
Winter _____	W _____

The upper edge of the deck line from which these freeboards are measured is _____ inches above the top of the _____ deck at side.



This is to certify that this ship has been surveyed and the freeboards and load lines shown above have been found to be correctly

marked upon the vessel in manner and location as provided by the load line regulations of the Commandant, U. S. Coast Guard, applicable to the Great Lakes.

This certificate[1] remains in force until _____. Issued at _____ on the _____ day of _____ 19__.

(Here follows the signature, seal, if any, and the name of the authority issuing the certificate.)

NOTES: In accordance with the Great Lakes Load Line Regulations the diamond and lines must be permanently marked by center punch marks or cutting.

(On the reverse side of the load line certificate, or on a separate sheet attached and forming part of the certificate, provision is to be made for annual inspection and renewal indorsements.)

(Reverse side of certificate)

ANNUAL INSPECTIONS

I have surveyed this ship for the purpose of seeing whether this Certificate should remain in force and the Survey has been completed to my satisfaction.

Sgd_____ at _____
(Signature of Surveyor) (Place)
on _____
(Date)

I have surveyed this ship for the purpose of seeing whether this Certificate should remain in force and the Survey has been completed to my satisfaction.

Sgd_____ at _____
(Signature of Surveyor) (Place)
on _____
(Date)

I have surveyed this ship for the purpose of seeing whether this Certificate should remain in force and the Survey has been completed to my satisfaction.

Sgd_____ at _____
(Signature of Surveyor) (Place)
on _____
(Date)

I have surveyed this ship for the purpose of seeing whether this Certificate should remain in force and the Survey has been completed to my satisfaction.

Sgd_____ at _____
(Signature of Surveyor) (Place)
on _____
(Date)

Renewal of Load Line Certificate.

The provisions of the Great Lakes Load Line Regulations having been fully complied with by this vessel or when not fully complied with proper penalties to freeboard having been enforced, this certificate is renewed till—

Place _____ Date _____

_____
(Signature and name of authority)

PART 46—SUBDIVISION LOAD LINES FOR PASSENGER VESSELS

Part 46 is amended to read as follows:

SUBPART 46.01—AUTHORITY AND PURPOSE

Sec.
46.01–1 Purpose.
46.01–5 Authority.
46.01–10 Responsibility for administration.
46.01–15 Application of regulations.

SUBPART 46.05—DEFINITIONS USED IN THIS PART

46.05–1 Passenger vessel.
46.05–10 Foreign vessel.
46.05–15 Coastwise voyage.
46.05–20 Great Lakes voyage.
46.05–25 New passenger vessel.
46.05–30 Existing passenger vessel.

SUBPART 46.10—ADMINISTRATION

Sec.
46.10–1 Relaxation from regulations.
46.10–5 Load line requirements of Parts 43, 44, and 45, for subdivision.
46.10–10 Marks to indicate subdivision load lines.
46.10–15 Survey for the establishment and renewal of subdivision load line marks.
46.10–20 Application for the assignment and renewal of subdivision load lines.
46.10–25 Equivalents.
46.10–30 Subdivision load line certificates.
46.10–35 Validity of subdivision load line certificate.
46.10–40 Nonsubmergence subdivision load line (Great Lakes).
46.10–45 Nonsubmergence subdivision load lines in salt water.
46.10–50 Drills and inspections.
46.10–55 Log book entries.
46.10–60 Control.
46.10–65 Construction.
46.10–70 Plans and inspections of new and converted vessels.

SUBPART 46.15—SUBDIVISION LOAD LINES FOR PASSENGER VESSELS ENGAGED IN FOREIGN AND COASTWISE VOYAGES, INCLUDING VOYAGES ON THE GREAT LAKES

46.15–1 Procedure for determination of subdivision load line.
46.15–5 Engineering requirements.
46.15–10 Subdivision load lines.

AUTHORITY: §§ 46.01–1 to 46.15–10 issued under sec. 2, 45 Stat. 1493, as amended, sec. 2, 49 Stat. 888, as amended; 46 U. S. C. 85a, 88a. Interpret or apply R. S. 4490, as amended, sec. 3, 24 Stat. 129, as amended, 41 Stat. 305, as amended, sec. 5, 49 Stat. 1384, as amended, secs. 1, 2, 49 Stat. 1544, as amended, sec. 3, 54 Stat. 346, sec. 5, 55 Stat. 244, as amended; 46 U. S. C. 482, 483, 363, 369, 367, 1333, 50 U. S. C., app., 1275.

SUBPART 46.01—AUTHORITY AND PURPOSE

§ 46.01–1 *Purpose.* (a) The purpose of the regulations in this part is to set forth uniform minimum requirements applicable to passenger vessels required to have subdivision load lines. These requirements deal with the following:

(1) Load line requirements applicable before a passenger vessel will be marked with and certificated as to subdivision load lines.

(2) Assigning, marking, and recording of subdivision load lines.

(3) Administration of subdivision load lines.

(4) Application of requirements to passenger vessels.

§ 46.01–5 *Authority* (a) The regulations regarding subdivision and subdivision load lines interpret or apply R. S. 4490, as amended; sec. 3, 24 Stat. 129, as amended; 41 Stat. 305, as amended; sec. 2, 45 Stat. 1493, as amended; sec. 2, 49 Stat. 888, as amended; sec. 5, 49 Stat. 1384, as amended; secs. 1 and 2, 49 Stat. 1544, as amended; sec. 3, 54 Stat. 346; and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 482, 483, 363, 85a, 88a, 369, 367, 1333, and 50 U. S. C. App. 1275). The International Load Line Convention, 1930, and the International Convention for Safety of Life at Sea, 1948, also establish minimum requirements for load lines and subdivision.

§ 46.01–10 *Responsibility for administration.* (a) Under the direction and supervision of the Secretary of the Treasury, and in accordance with the delegation of authority in an order dated July 31, 1950 (15 F. R. 6521), the Commandant, United States Coast Guard, is vested with the responsibility and authority to determine the position and to assure the correct marking of subdivision load lines on all passenger vessels subject to the International Convention for Safety of Life at Sea, 1948, or the Load Line Act of March 2, 1929, as amended, or the Coastwise Load Line Act, 1935, as amended (45 Stat. 1492–1494, 49 Stat. 888–890; 46 U. S. C. 85–85g, 88–88i).

§ 46.01–15 *Application of regulations.* (a) No passenger vessel of the United States required to be marked with subdivision load lines shall depart from any port or place for a foreign voyage by sea, a coastwise voyage by sea, or a voyage on the Great Lakes; no foreign passenger vessel belonging to a country that has ratified or acceded to the International Convention for Safety of Life at Sea, 1948, shall depart from any port or place under the jurisdiction of the United States, and no foreign passenger vessel of 150 gross tons or over subject to the Load Line Act of March 2, 1929, as amended, or the Coastwise Load Line Act, 1935, as amended, shall depart from any port or place under the jurisdiction of the United States including ports on the Great Lakes, unless such passenger vessel has been marked with subdivision load lines in accordance with the regulations in this part and has on board a valid certificate certifying to the correctness of the location of such subdivision load line marks.

(b) Subdivision load lines shall be marked on both sides of passenger vessels where determined and in the manner described in Subpart 46.15 as applicable to the vessel's service.

SUBPART 46.05—DEFINITIONS USED IN THIS PART

§ 46.05–1 *Passenger vessel.* (a) For the purpose of the regulations in this part, a vessel is a passenger vessel if:

(1) Engaged on an international voyage by sea, it carries or is authorized to carry more than 12 passengers; or,

(2) Engaged on a coastwise voyage by sea or a voyage on the Great Lakes, it carries or is authorized to carry more than 16 persons in addition to the crew.

§ 46.05–10 *Foreign voyage.* (a) A foreign voyage for the purpose of marking passenger vessels with subdivision load lines is a voyage by sea between a port under the jurisdiction of the United States and a port of a foreign country, its colonies, territories, or protectorates, or conversely (a voyage exclusively on the Great Lakes excepted).

§ 46.05–15 *Coastwise voyage.* A coastwise voyage by sea, for the purpose of marking passenger vessels with subdivision load lines, is a voyage in which a vessel in the usual course of her employment proceeds from one port or place in the United States to another port or place in the United States or from a port or place in a territory or possession of the United States to another port or place in that territory or possession, and passes outside the line dividing inland

[1] Upon the expiration of the certificate, renewal must be obtained as provided by the Great Lakes Load Line Regulations and the certificate so endorsed.

waters from the high seas, as established in accordance with section 2 of the Act of February 19, 1895, as amended (28 Stat. 672; 33 U. S. C. 151).

§ 46.05–20 *Great Lakes voyage.* A Great Lakes voyage is any voyage from a United States port or place on the Great Lakes to another United States port or place on the Great Lakes or to a Canadian port or place on the Great Lakes, or conversely.

§ 46.05–25 *New passenger vessel.* A new passenger vessel is a vessel whose keel was laid or was a vessel converted into a passenger vessel on or after November 19, 1952.

§ 46.05–30 *Existing passenger vessel.* An existing passenger vessel in respect to its voyage is any passenger vessel that is not a new passenger vessel as defined in § 46.05–25.

SUBPART 46.10—ADMINISTRATION

§ 46.10–1 *Relaxation from regulations.* (a) New passenger vessels making foreign voyages by sea shall comply with the requirements in this part. An existing passenger vessel engaged in foreign voyages by sea may be permitted relaxation from the requirements of this part if, in the opinion of the Commandant, U. S. Coast Guard, such requirements are unreasonable or impracticable.

(b) A new passenger vessel making coastwise voyages by sea or making Great Lakes voyages shall comply with the requirements in this part. An existing passenger vessel making coastwise voyages by sea or Great Lakes voyages may be permitted relaxation from the requirements of this part if, in the opinion of the Commandant, U. S., Coast Guard, such requirements are unreasonable or impracticable.

§ 46.10–5 *Load line requirements for subdivision.* (a) The load line requirements of Parts 43, 44, 45 of this subchapter as applicable to the passenger vessel and her service, shall be complied with before a passenger vessel will be marked with and certificated as to subdivision load lines.

§ 46.10–10 *Marks to indicate subdivision load lines.* (a) Marks to indicate the maximum mean draft to which a passenger vessel may be lawfully submerged shall be permanently marked on each side of the passenger vessel in the form, manner, and location provided in this part.

(b) The Commandant, U. S. Coast Guard, shall determine the position of the subdivision load lines by the application of the requirements contained in this part and Part 73 of Subchapter H (Passenger Vessels) of this chapter: *Provided*, That in determining the position of the load lines for passenger vessels engaged on coastwise voyages by sea and for passenger vessels engaged on Great Lakes voyages, due consideration shall be given to the age and condition of the passenger vessel, its subdivision, and the efficacy thereof and the probable stability of the vessel if damaged and such increases made to the freeboards as existing conditions indicate to be necessary. The correct marking of subdivision load lines on passenger vessels shall be certified to by the American Bureau of Shipping or a classification society approved by the Commandant for such purpose.

(c) Certificates certifying to the correctness of subdivision load line marks shall not be furnished until it is determined that the marks have been correctly placed upon the passenger vessel.

(d) In the case of passenger vessels that are required by the International Convention for Safety of Life at Sea to have on board a safety certificate, the certification of subdivision load line marks shall be made by letter to the Commandant, U. S. Coast Guard, Washington 25, D. C.

§ 46.10–15 *Survey for the establishment and renewal of subdivision load line marks.* (a) Every passenger vessel to be marked with and certificated for subdivision load lines must comply with the requirements as set forth in Subchapter H (Passenger Vessels) of this chapter for ocean, coastwise, and Great Lakes service as applicable to the particular vessel and the service in which she is to be employed.

(b) Every passenger vessel marked with a subdivision load line shall be subjected to the surveys specified in this paragraph. The details of the surveys or inspections indicated in § 46.40–15 (b) (1) through (3) shall be as set forth in the applicable sections of Part 71 of Subchapter H (Passenger Vessels) of this chapter.

(1) A survey before the vessel is put in service.

(2) A periodical survey once every 12 months.

(3) Additional surveys as occasion arises.

(4) Surveys required by Parts 43, 44, or 45 of this subchapter.

§ 46.10–20 *Application for the assignment and renewal of subdivision load lines.* (a) Application for assignment and renewal of subdivision load lines and certification thereof shall be made in writing to the Commandant, U. S. Coast Guard, Washington 25, D. C.

§ 46.10–25 *Equivalents.* (a) Where in the regulations in this part it is provided that a particular fitting, appliance, apparatus, or type thereof, shall be fitted or carried in a vessel engaged on foreign voyages by sea or that any particular arrangement shall be adopted, there may be substituted any other fitting or appliance or type thereof or any other arrangement provided that the Commandant, U. S. Coast Guard, shall have been satisfied by suitable trials that the fitting, appliance, or apparatus, or type thereof, or that the arrangement substituted is at least as effective as that specified in this part.

(b) Where, in the application of the regulations in this part to passenger vessels engaged in coastwise voyages by sea and on Great Lakes voyages, it is desired to substitute other construction, arrangement, fitting, or appliance, or type thereof, such substitution may be made if approved by the Commandant, U. S. Coast Guard, provided the degree of safety provided by this part is obtained.

§ 46.10–30 *Subdivision load line certificates.* (a) Passenger vessels engaged in foreign voyages by sea shall have their subdivision load lines certificated on the safety certificate required by the International Convention for Safety of Life at Sea, 1948. Safety certificates shall be issued by the Commandant, U. S. Coast Guard, Washington 25, D. C., for a period not to exceed one year. These vessels will also be provided with the load line certificate required by Part 43 of this subchapter, the minimum freeboard shown thereon to be not less than the minimum freeboard corresponding to the principal passenger condition. The fact that they are subdivision load lines is to be noted on the load line certificate.

(b) Passenger vessels engaged on coastwise voyages by sea or Great Lakes voyages shall have the position of their subdivision load lines recorded on a load line certificate in the form required by Parts 43 or 45 of this subchapter. The fact that they are subdivision load lines is to be noted on the load line certificate.

(c) A note shall be added to the load line certificate below the signature of the assigning authority in the following form:

The bulkhead deck used for determining the position of the subdivision load lines certified above is ---------- (here described bulkhead deck).

(d) Annual inspections of passenger vessels shall be as required by §§ 43.01–55 and 46.10–15 of this subchapter and renewal of passenger vessels' load line certificates shall be as required by § 43.01–75.

(e) Each new passenger vessel which receives its first load line certificate shall also be provided with a copy of the load line survey report as required by §§ 43.01–40 or 45.01–30 of this subchapter.

§ 46.10–35 *Validity of subdivision load line certificates.* (a) Subdivision load line certificates issued to passenger vessels shall only be valid during the time for which the certificates are issued.

(b) If, due to any cause, the conditions as required by this part are changed, or the regulations in this part are not carried out, the load line certificate may be cancelled and the load lines considered nonexistent: *Provided*, That if the conditions causing the cancellation of the certificate are satisfactorily corrected, the load line certificate shall be reinstated for the remainder of its term.

(c) A valid subdivision load line certificate for foreign voyages by sea shall be valid for coastwise voyages by sea and Great Lakes voyages. A valid subdivision load line certificate for coastwise voyages by sea shall be valid for Great Lakes voyages but not for foreign voyages by sea. A valid subdivision load line certificate for Great Lakes voyages shall not be valid for foreign or coastwise voyages by sea.

§ 46.10–40 *Nonsubmergence subdivision load line (Great Lakes).* (a) Passenger vessels on the Great Lakes of 150 gross tons or over shall not submerge the subdivision load line applicable to the voyage.

§ 46.10–45 *Nonsubmergence subdivision load lines in salt water.* (a) Passenger vessels required to be marked with subdivision load lines, engaged on foreign and coastwise voyages other than the Great Lakes voyages, shall not submerge in salt water the subdivision load line applicable to the voyage. Passenger vessels engaged on ocean foreign or coastwise voyages may be marked with fresh water load lines. A passenger vessel on foreign or coastwise voyages (except Great Lakes voyages) may have an allowance made for the degree of brackishness of the water in which the vessel is floating but not for the weight of fuel, water, etc., required for consumption between the point of departure and the open sea, and no allowance is to be made for bilge or ballast water that may be in the passenger vessel at the time of departure.

§ 46.10–50 *Drills and inspections.* (a) For the required drills and inspections to be conducted on passenger vessels, see Subpart 78.17 of Subchapter H (Passenger Vessels) of this chapter.

§ 46.10–55 *Log book entries.* (a) For required log book entries to be made on passenger vessels, see Subpart 78.17 of Subchapter H (Passenger Vessels) of this chapter.

§ 46.10–60 *Control.* (a) The duties and responsibilities of the Collector of Customs or the Coast Guard District Commander in respect to the load lines certified on the safety certificates of, and marked on passenger vessels engaged on foreign voyages by sea shall be the same as stated in § 43.01–97 of this subchapter.

(b) The duties and responsibilities of the Collector of Customs or the Coast Guard District Commander in respect to passenger vessels engaged in coastwise voyages by sea or Great Lakes voyages are as defined by § 43.01–97 or § 45.01–85 of this subchapter, as applicable.

§ 46.10–65 *Construction.* (a) The watertight subdivision of every passenger vessel shall be as efficient as possible, having regard to its intended service. This principle is given effect by the requirements of Part 73 of Subchapter H (Passenger Vessels) of this chapter which provide for variations in the standard of subdivision according to the length of the vessel and the degree to which the vessel approaches the exclusive passenger type, the highest standard being required in vessels of the greatest length engaged primarily in the carriage of passengers.

(b) Passenger vessels engaged in foreign voyages by sea or coastwise voyages by sea or voyages on the Great Lakes, to be marked with subdivision load lines shall comply with the requirements in this part.

§ 46.10–70 *Plans and inspections of new and converted vessels.* (a) Plans for a new passenger vessel or a vessel to be converted to a passenger vessel shall be submitted to the Commandant as required by Subpart 71.65 of Subchapter H (Passenger Vessels) of this chapter.

(b) Inspections shall be made during the construction or conversion of the vessel as required by Subpart 71.20 of Subchapter H (Passenger Vessels) of this chapter.

(c) Upon completion of the construction or conversion of a passenger vessel, a stability test shall be performed and stability information shall be supplied to the operator as required by Part 74 of Subchapter H (Passenger Vessels) of this chapter.

SUBPART 46.15—SUBDIVISION LOAD LINES FOR PASSENGER VESSELS ENGAGED IN FOREIGN, COASTWISE, AND GREAT LAKES VOYAGES

§ 46.15–1 *Procedure for determination of subdivision load line.* (a) The procedure for the determination of the subdivision load line as well as special construction features of the vessel shall be as set forth in Subpart 72.01 and Parts 73 and 74 of Subchapter H (Passenger Vessels) of this chapter.

§ 46.15–5 *Engineering requirements.* (a) Bilge and ballast systems, piping, inlets and discharges, ash chutes, astern power, and auxiliary steering shall be in accordance with the provisions of Subchapter F (Marine Engineering) of this chapter.

§46.15–10 *Subdivision load lines.* (a) Subdivision load lines shall be located by measuring vertically down from the deck line required by Part 43 of this subchapter.

(b) The length, width, and manner of marking the lines shall be as provided in Subpart 43.05 of this subchapter.

(c) No subdivision load line is to be placed so that the freeboard is reduced from that determined by the highest seasonal mark permitted by Part 43.

(d) When the highest subdivision load line is located on a vessel used as a passenger vessel in a position between the highest and lowest seasonal load line marks, the seasonal load line marks above the subdivision load line will be omitted and those below will be marked.

(e) When the freeboard from the highest subdivision load line on a vessel used as a passenger vessel is greater than the freeboard from the lowest load line permitted by Part 43 of this subchapter, the load lines required by Part 43 of this subchapter shall be omitted and the disk with its horizontal line located in line with the highest subdivision load line.

(f) One fresh water line shall be marked. When a subdivision and a normal load line are combined, the normal fresh water line only shall be used unless the position of the subdivision load line is such that confusion will result, in which case a subdivision fresh water line may be used, marked FC_1 and the normal fresh water line omitted.

(g) Subdivision load lines shall be aft of the vertical line. The vertical line shall be extended as necessary to connect the lowest and highest load lines marked on the vessel.

(h) When a vessel has spaces used for cargo and passengers alternatively so that the position of the subdivision load line varies with the service, subdivision load lines for the principal passenger condition shall be marked and denoted by C_1 and the alternative conditions marked and denoted by C_2, C_3, etc. The position of each load line and the conditions under which a particular load line is applicable shall be noted in the certificate.

(i) The principal passenger condition for a vessel having spaces used for passengers and cargo alternatively is the condition where only those spaces appropriated exclusively to passengers are taken into consideration for determination of the subdivision load line.

(j) For Great Lakes vessels, references to Part 43 shall read Part 45 and a "diamond" shall be substituted for the "disc". No "fresh water" line will be marked.

Subchapter F—Marine Engineering

PART 50—GENERAL PROVISIONS

Part 50 is amended to read as follows:

SUBPART 50.01—BASIS AND PURPOSE

Sec.

50.01–1 Authority.
50.01–5 Assignment of functions.
50.01–10 Purpose of regulations.
50.01–15 Application of regulations.

SUBPART 50.10—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

50.10–1 Commandant.
50.10–5 Coast Guard District Commander.
50.10–10 Officer in Charge, Marine Inspection.
50.10–15 Marine inspector or inspector.
50.10–20 Requirements.
50.10–25 Headquarters.

AUTHORITY: §§ 50.01–1 to 50.10–25 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 50.01—BASIS AND PURPOSE

§ 50.01–1 *Authority.* (a) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375 and 416), as well as in other provisions of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) The regulations regarding marine engineering interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, and 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, and 50 U. S. C. App. 1275).

§ 50.01–5 *Assignment of functions.* By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were

transferred to the Commandant, United States Coast Guard by Reorganization Plan No. 26 of 1950, effective July 31, 1950, the functions formerly vested in the Commandant, United States Coast Guard were transferred to the Secretary of the Treasury with certain specific exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 50.01–10 *Purpose of regulations.* The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for marine engineering in accordance with the intent of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various International Conventions for Safety of Life at Sea and other treaties which affect the merchant marine. The regulations are necessary to carry out the provisions of law affecting inspected vessels and such regulations have the force of law.

§ 50.01–15 *Application of regulations.* (a) The regulations in this subchapter contain specifications and requirements for materials, design, construction, installation, and inspection of machinery, boilers, unfired pressure vessels, safety valves and appurtenances, including piping systems, upon the strength and efficiency of which safety of life is dependent.

(b) The regulations in this subchapter apply to installations contracted for or built on or after July 1, 1935. The regulations in Subchapter G (Marine Engineering Installations Contracted for Prior to July 1, 1935) of this chapter apply only to installations contracted for or built prior to July 1, 1935.

(c) The regulations in this subchapter are not retroactive in effect, except as provided in paragraph (d) of this section or if specifically provided for in the regulation at the time it is amended or added. The regulations amended or added subsequent to July 1, 1935, are applicable to installations contracted for or built on or after the effective date of such regulations. For the purpose of recalculating the maximum allowable pressure of boilers, unfired pressure vessels and piping under the provisions of § 61.20–15 (f), the formulas found in this subchapter may be used for boilers, unfired pressure vessels and piping: *Provided*, That such recalculation shall not permit a higher pressure than that originally allowed by the regulations in effect at the time such work was contracted for or built.

(d) Where existing vessels are reboilered, the mountings and attachments, including feed and blow-off valves and fittings, shall be renewed in accordance with regulations in this subchapter, in effect at the time such work is contracted for or built. The steam piping shall be gaged and examined by the Officer in Charge, Marine Inspection, and if found to be of the thickness required at the time the piping was installed it may be continued in use so long as the Officer in Charge, Marine Inspection, is of the opinion that the piping may be safely continued in use. Changes in specifications of articles of equipment shall not apply to such articles which have been passed as satisfactory until replacement shall become necessary.

§ 50.10–1 *Commandant.* The term "Commandant" means the Commandant of the Coast Guard.

§ 50.10–5 *Coast Guard District Commander.* The term "Coast Guard District Commander" means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within his district, which include the inspections, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 50.10–10 *Officer in Charge, Marine Inspection.* The term "Officer in Charge, Marine Inspection," means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who under the superintendence and direction of the Coast Guard District Commander is in charge of an inspection district for the performance of duties with respect to the inspections, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 50.10–15 *Marine inspector or inspector.* The terms "marine inspector" or "inspector" mean any person from the civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspections, enforcement, and the administration of Title 52, R. S., and acts amendatory thereof or suplemental thereto, and rules and regulations thereunder.

§ 50.10–20 *Requirements.* The term "requirements" refers to process of manufacture, characteristic, physical and chemical properties, tests, workmanship, and finish of materials.

§ 50.10–25 *Headquarters.* The term "headquarters" means the Office of the Commandant, United States Coast Guard, Washington 25, D. C.

PART 52—CONSTRUCTION

SUBPART 52.01—PROCEDURE AND GENERAL REQUIREMENTS

1. Sections 52.01–20 and 52.01–25 are amended to read as follows:

§ 52.01–20 *Appeals.* In case the design is disapproved by the Officer in Charge, Marine Inspection, the manufacturer may appeal within 30 days, to the Coast Guard District Commander of the district, and should the Coast Guard District Commander sustain the Officer in Charge, Marine Inspection, the manufacturer may, within 30 days, further appeal to the Commandant. The decision of the Commandant shall be final.

52.01–25 *Certifications and affidavits of manufacturers.* (a) In requesting inspection of a new boiler or pressure vessel subject to inspection by the Coast Guard, the manufacturer shall file with the Officer in Charge, Marine Inspection, a certification of a data report in triplicate on Form CG 2935 for boilers or Form CG 2936 for unfired pressure vessels. (See § 61.45–5 or § 61.45–10 of this subchapter.)

(b) Manufacturers of class B materials, such as pipe, valves, flanges, fittings, traps, separators, castings, forgings, etc., or appliances, proposed for use on vessels subject to inspection by the Coast Guard, shall file at Headquarters affidavits duly executed on Form CG 935A certifying that such materials or appliances will be manufactured in accordance with the regulations in this subchapter. (See § 61.45–15 of this subchapter.)

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275)

2. Section 52.01–45 *Inspection of boilers under construction* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

3. Section 52.01–55 is amended to read as follows:

§ 52.01–55 *Request for increase of pressure.* (a) When a maximum allowable pressure has been established for a boiler, an increase in pressure shall not be authorized unless the boiler design, piping system and machinery meet the requirements of this subchapter for the pressure requested. An increase in maximum allowable pressure shall be granted only by the Commandant upon presentation of data or drawings proving that the requested increase in pressure is justified.

(b) When existing boilers are replaced by new boilers designed to operate at pressures in excess of the pressure allowed by the certificate of inspection, an increase in pressure shall not be authorized unless the boiler design, piping systems and machinery meet the requirements of this subchapter for the maximum pressure requested. An increase in maximum allowable pressure shall be granted only by the Commandant upon presentation of data or drawings proving that the boiler, piping system and machinery will operate safely at the desired maximum pressure of the system.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.)

4. Section 52.01–65 *Repairs, replacements, or alterations* is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

SUBPART 52.65—SAFETY VALVES

Subpart 52.65, consisting of §§ 52.65–1 to 52.65–15, is amended to read as follows:

Sec.
52.65–1 Definitions.
52.65–5 General requirements.
52.65–15 Installation.

AUTHORITY: §§ 52.65–1 to 52.65–15, issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4424–4431, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

§ 52.65–1 *Definitions* — (a) *Safety valve.* Safety valve is a valve designed to open or close automatically to relieve excess pressure in the pressure vessel to which it is attached.

(b) *Spring - loaded safety valve.* Spring-loaded safety valve is a safety valve fitted with a spring which normally holds the valve disk in a closed position against the seat and allows it to open or close at predetermined pressures. Spring-loaded safety valves are characterized by pop action.

(c) *Pressure loaded safety valve.* Pressure loaded pilot actuated safety valve is one which is held in the closed position by steam pressure and controlled in operation by a pilot actuator valve.

(d) *Spring loaded pilot actuated safety valve.* Spring loaded, pilot actuated safety valve is one in which a spring is used in the conventional way to hold the disk against the seat, but which has a piston attached to the spindle and inclosed within a cylinder, which when subjected to a limiting or set pressure, unbalances the spring load thereby opening the valve.

(e) *Spring loaded pilot valve.* Spring loaded pilot valve is a conventional safety valve designed to actuate another spring loaded safety valve through a pressure transmitting line led from the body of the pilot valve.

(f) *Lever safety valve.* Lever safety valve is a safety valve having the disk held on its seat by the action of a weight hung on a lever which is pivoted on a fulcrum.

(g) *Relief valve.* Relief valve is a valve constructed on the general design of safety valves to relieve excess pressure. It may be used for service where an approved safety valve is not required by the regulations of this subchapter. (See § 54.07–5 of this subchapter.)

§ 52.65–5 *General requirements.* (a) Each boiler and its superheater shall be provided with one or more approved safety valves designed, constructed and flow-tested in conformance with Subpart 162.001 in Subchapter Q (Specifications) of this chapter. Boilers of more than 500 square feet of water heating surface but without superheaters shall be fitted with at least two safety valves, and boilers with integral superheaters shall have at least two safety valves attached to the drum and one safety valve fitted to the superheater outlet. On river steam vessels whose boilers are connected in batteries without means of shutting off one boiler from another, each battery of boilers shall be treated as a single boiler and equipped with not less than two safety valves of equal size.

(b) Drum safety valves shall be set to relieve at a pressure not in excess of that allowed by the certificate of inspection. Where for any reason this is lower than the pressure for which the boiler was originally designed, an accumulation test, as provided for in paragraph (g) of this section, shall be conducted to insure that the relieving capacity of the safety valve is sufficient for the lower pressure.

(c) The setting of the superheater safety valve shall not exceed the design pressure of the machinery plus the pressure drop in the piping from the superheater outlet to the machinery. To prevent damage to the superheater, the drum safety valves shall be set at a pressure not less than that of the superheater safety valve setting plus 5 pounds minimum plus approximately the normal load pressure drop through the superheater. If there are no intervening valves between the superheater safety valve and boiler, the relieving capacity of the superheater safety valve rated in accordance with the requirements of Subpart 162.001, Subchapter Q (Specifications), may be included in determining the total required relieving capacity of the boiler, provided the drum safety valves have at least 75 percent of the aggregate relieving capacity required. The foregoing requirements do not apply when drum pilot actuated superheater safety valves are used. Installations employing pilot actuated safety valves will be given special consideration by the Commandant.

(d) In the event the maximum steam generating capacity of the boiler is increased by any means, the relieving capacity of the safety valves shall be checked by an inspector and if determined to be necessary, valves of increased relieving capacity shall be installed.

(e) The total rated relieving capacity of drum and superheater safety valves as certified by the valve manufacturer shall not be less than the maximum generating capacity of the boiler as certified by the boiler manufacturer. The safety valves shall be capable of discharging all the steam that can be generated without allowing the pressure to rise more than 6 percent above the set pressure of the valve.

(f) (1) The boiler manufacturer may certify the normal as well as the maximum generating capacity of the boiler. In the absence of such certification the minimum safety valve relieving capacity shall be determined upon the basis of the pounds of steam generated per hour per square foot of boiler heating surface and the water-wall heating surface, as given in the Table 52.65–5 (f) (1).

TABLE 52.65–5 (f) (1)—MINIMUM RELIEVING CAPACITY

Type of boiler	Minimum pounds of steam per hour per square foot of surface					
	Boiler heating surface			Water wall surface		
	Hand-fired	Stoker-fired	Oil, or pulverized fuel-fired	Hand-fired	Stoker-fired	Oil, or pulverized fuel-fired
Fire-tube	5	7	8	8	10	14
Water-tube	6	8	10	8	12	16

(2) In many cases a greater relieving capacity of safety valves must be provided than required by this paragraph, and in every case the requirements of paragraph (e) of this section shall be met.

(3) The heating surface shall be computed for that side of the boiler surface exposed to the products of combustion exclusive of the superheating surface. In computing the heating surface only the tubes, fireboxes, shells, tube sheets, and the projected area of the headers need be considered. For vertical fire-tube boilers, only that portion of the tube surface up to the middle gauge cock is to be computed. The minimum number and size of safety valves required shall be determined on the basis of the aggregate steaming capacity and the aggregate rated relieving capacity of the valves shall be in accordance with Subpart 162.001 in Subchapter Q (Specifications) of this chapter.

(g) An accumulation test shall be conducted in the presence of an inspector to determine the adequacy of protection provided by the aggregate relieving capacity of the boiler safety valves except in instances where possible damage to superheaters makes this impractical. During this test all steam outlet connections except the safety valves and such others as may be necessary to operate the boiler shall be closed and the fires forced to their maximum capacity for a period of 15 minutes for fire-tube boilers and 7 minutes for water-tube boilers.

(h) On new installations, the safety valve diameter for power boilers, superheaters, or unfired steam generators shall be not less than 1½ inches nor more than 4 inches. Safety valves of 4½ inches diameter may be used for replacements on existing boilers or unfired steam generators. The foregoing diameters apply to the valve inlet.

(i) Lever or weighted safety valves now installed may be continued in use and may be repaired, but when renewals are necessary, lever or weighted safety valves shall not be used. All such replacements shall conform to the requirements of Subpart 162.001 in Subchapter Q (Specifications) of this chapter.

(j) Gags or clamps for holding the safety valve disk on its seat shall be carried on board the vessel at all times.

§ 52.65–15 *Installation.* (a) The final setting of boiler safety valves shall be checked and adjusted under steam

pressure by an inspector who upon acceptance shall seal the valves. This requirement applies to drum and also superheater safety valves when the latter provide part of the required relieving capacity for the boiler.

(b) Except in the case of superheater valves, safety valves are not to be connected to any fitting with outlets for any purpose other than the escape of steam through the safety valve. They shall be connected directly to the boiler or as close thereto as possible and installed in an upright position with spindles vertical except in the case of especially designed and approved valves.

(c) No shut-off valves shall be placed between the required safety valves and the boiler or unfired steam generator, nor in the escape pipe between the safety valve and atmosphere, nor in the drain pipe from the safety valve.

(d) Twin valves, made by placing individual valves on Y bases, or duplex valves having two valves in the same body, shall be of equal size.

(e) (1) To insure safety valves being free, each safety valve shall have a substantial lifting device by which the valve disk may be positively lifted from its seat when there is at least 75 percent of the maximum allowable pressure on the boiler. Such mechanism shall be connected by suitable relieving gear so arranged that controls may be operated from the fireroom or engine-room floor.

(2) When, due to high pressure, it is impracticable to fit a relieving gear to raise the safety valve from its seat in order to relieve the boiler of pressure, suitable piping and a valve having a relieving capacity of not less than the safety valve(s), may be connected from the boiler to the escape pipe or condenser. The valve shall be arranged to permit operation from the fire-room or engine-room floor.

SUBPART 52.70—BOILER MOUNTINGS AND ATTACHMENTS

Section 52.70–25 *Feed connections* is amended by canceling paragraph (b).

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 53—LOW PRESSURE HEATING BOILERS

SUBPART 53.03—STEEL PLATE HEATING BOILERS

1. Section 53.03–60 is amended to read as follows:

§ 53.03–60 *Safety valves.* (a) Each steam heating boiler shall have one or more approved safety valves set to discharge at a pressure of not to exceed 30 p. s. i., and designed, constructed and flow-tested for actual capacity in conformance with Subpart 162.012 of Subchapter Q (Specifications) of this chapter.

(b) The minimum safety valve capacity in pounds per hour shall be determined by dividing the maximum B. t. u. output at the boiler nozzle obtained by the firing of any fuel, for which the unit is designed, by 1,000 or by multiplying the square feet of heating surface by 5. In many cases a greater relieving capacity of valves will have to be provided than the minimum specified by these regulations. In all cases the requirements of paragraph (c) of this section shall be met.

(c) The steam safety valve capacity for each boiler shall be such that with the fuel-burning equipment installed, the pressure cannot rise more than 6 percent above the maximum allowable pressure of the boiler. For set pressures not exceeding 15 p. s. i., the safety valve capacity may be such that with the fuel-burning equipment installed, the pressure cannot rise more than 5 pounds above the maximum allowable pressure.

(d) When operating conditions are changed, or additional boiler heating surface is installed, the safety valve capacity shall be increased, if necessary, to meet the new conditions and be in accordance with paragraph (c) of this section. The additional safety valves may be installed on the outlet piping provided there is no intervening valve.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret of apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.)

2. Part 53 is amended by adding a new § 53.03–62 reading as follows:

§ 53.03–62 *Relief valves.* (a) Each hot-water heating or hot-water supply boiler shall have one or more approved relief valves set to relieve at a pressure not to exceed 30 p. s. i., and designed, constructed and flow-tested for actual capacity in conformance with Subpart 162.013 of Subchapter Q (Specifications) of this chapter.

(b) The steam relieving capacity in pounds per hour shall be determined by dividing the maximum B. t. u. output at the boiler nozzle obtained by the firing of any fuel, for which the unit is designed, by 1,000 or by multiplying the square feet of heating surface by 5. In many cases a greater relieving capacity of valves will have to be provided than that minimum specified by the regulations in this subpart. In every case, the requirements of paragraph (c) of this section shall be met.

(c) The relief valve capacity for each boiler shall be such that with any fuel burning equipment installed the pressure cannot rise more than 3 pounds per square inch above the maximum allowable pressure of the boiler.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275)

3. Section 53.03–65 *Discharge capacities of safety and relief valves* is cancelled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416).

SUBPART 53.05—CAST-IRON HEATING BOILERS

1. Section 53.05–40 is amended to read as follows:

§ 53.05–40 *Safety and relief valves.* (a) The provisions of §§ 53.03–60, 53.03–62 and 53.03–63 shall apply to cast-iron heating boilers except as specified in this section.

(b) Safety and relief valves shall be set to discharge at a pressure not to exceed 15 pounds per square inch.

(c) Safety and relief valves for cast-iron heating boilers shall be such that with any fuel burning equipment installed, the pressure cannot rise above the maximum allowable pressure more than 5 pounds per square inch for a steam boiler and 3 pounds per square inch for a hot-water boiler.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275)

2. Section 53.05–45 *Discharge capacities of safety and relief valves,* is cancelled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 54—UNFIRED PRESSURE VESSELS

SUBPART 54.07—PRESSURE-RELIEF DEVICES

Part 54 is amended by adding a new § 54.07–25 reading as follows:

§ 54.07–25 *Safety relief valves.* (a) Unified pressure vessels containing liquefied compressed gases and where required by the regulations of this subchapter, shall be fitted with one or more approved safety relief valves designed, constructed and flow-tested for capacity in conformance with Subpart 162.018 of Subchapter Q (Specifications) of this chapter.

(b) Each safety relief valve shall be set to start to discharge at a pressure not in excess of the design pressure of the vessel and the combined relieving capacities of the safety relief valves shall be sufficient to prevent a rise of pressure in the vessel of more than 20 percent above the maximum design pressure when all the safety relief valves are blowing.

(c) The minimum rates of discharge of the safety relief valves for liquefied compressed gas service shall be not less than that required by the applicable regulations governing the transportation in bulk of the particular commodity.

NOTE: The requirements covering the transportation of liquefied petroleum gases in bulk may be found in Part 38 of Subchapter D (Tank Vessels) of this chapter. The requirements covering the transportation in bulk of certain liquefied compressed gases of a hazardous nature, but not considered flammable, may be found in Part 146 of Subchapter N (Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

(d) Each safety relief valve shall be tested in the presence of an inspector before being placed in service. The tests

shall satisfactorily indicate that the safety relief valves will start to discharge at a pressure not in excess of the design pressure of the tank

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275)

PART 55—PIPING SYSTEMS, PUMPS, REFRIGERATION MACHINERY, AND FUEL TANKS

SUBPART 55.07—DETAIL REQUIREMENTS

1. Section 55.07–25 (m) is amended to read as follows:

§ 55.07–25 *Installation.* • • •

(m) (1) Pipes piercing the collision bulkhead shall be fitted with screwdown valves operable from above the bulkhead deck and the valve shall be secured to the bulkhead fitting inside the forepeak tank.

(2) Passenger vessels shall not have the collision bulkhead pierced below the margin line by more than one pipe conveying liquids in the forepeak tank except as provided for in subparagraph (3) of this paragraph.

(3) If the forepeak tank is divided to hold two different kinds of liquids, the collision bulkhead may be pierced below the margin by two pipes, provided there is no practical alternative to the fitting of the second pipe and further provided the safety of the vessel is maintained.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.)

2. Section 55.07–30 *Tests* is cancelled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

SUBPART 55.10—PUMPING ARRANGEMENTS AND PIPING SYSTEMS

Sections 55.10–45 and 55.10–50 are amended to read as follows:

§ 55.10–45 *Gasoline fuel systems*—(a) *Material.* (1) Fuel supply piping to the engines shall be of seamless drawn annealed copper tubing or iron pipe size copper pipe.

(2) Tubing wall thicknesses shall not be less than that shown in Table 55.10–45 (a).

TABLE 55.10–45 (a)—TUBING WALL THICKNESS

Outside diameter of tubing in inches	Thickness	
	B. W. G.	Inch
[illegible], ¼	#21	0.032
[illegible]	#20	.035
5/16, ⅜	#19	.042

(3) Tubing fittings shall be of nonferrous drawn or forged metal and of the flared type. Tubing shall be cut square and flared by suitable tools. Tube ends shall be annealed before flaring. Pipe fittings shall be of nonferrous material. Pipe thread joints shall be made tight with a suitable compound.

(4) Valves for fuel lines shall be of nonferrous material of the union-bonnet type with ground seats. Cocks are prohibited for use in gasoline fuel lines.

(b) *Installation.* (1) The piping shall be run in sight wherever practicable, protected from mechanical injury, and effectively secured against vibration by use of soft nonferrous metal clips. Where passing through steel decks or bulkheads, fuel lines shall be protected by close fitting ferrules or stuffing boxes. A short length of suitable flexible tubing or a loop of copper tubing shall be installed in the fuel line at or near the carburetor to prevent damage by vibration.

(2) Valves in fuel lines shall be installed to close against the flow.

(c) *Shut-off valves.* Shut-off valves of a suitable type shall be installed in the fuel supply lines, one as close to each tank as practicable, and one as close to each carburetor as practicable. Where fuel tanks are installed below the weather deck, arrangements shall be provided for operating all shut-off valves at the tanks from outside the compartments in which they are located, preferably from an accessible position on the weather deck. The operating gear for the shut-off valves at the tanks shall be accessible at all times.

(d) *Strainers.* A suitable twin strainer shall be fitted in the fuel supply line in the engine compartment. Strainers shall be of the type opening on top for cleaning screens. A drip pan shall be fitted under the strainer.

(e) *Outlets and drains.* Outlets in fuel lines for drawing gasoline for any purpose are prohibited. Drains or any openings in the bottom of fuel tanks are prohibited.

(f) *Fuel suction connections.* All fuel suction and return lines shall enter the top of the fuel tanks and connections shall be fitted into spuds. Such lines shall extend nearly to the bottom of the tank.

(g) *Filling and sounding pipes.* Filling and sounding pipes shall be so arranged that vapors or possible overflow when filling cannot escape to the inside of the vessel but will discharge overboard. Such pipes shall terminate on the weather deck clear of any coamings and shall be fitted with suitable shut-off valves or deck plugs. Filling and sounding pipes shall extend to within one-half of their diameter from the bottom of the tank or from the surface of the striking plate in case of a sounding pipe. A flame screen of noncorrodible wire mesh shall be fitted in the throat of the filling pipe. Sounding pipes shall be kept closed at all times except during sounding.

(h) *Vent pipes.* Each tank shall be fitted with a vent the net cross-sectional area of which shall be not less than that of the filling pipe. The vent pipes shall terminate at least two feet above the weather deck and not less than three feet from any opening into living quarters or other below deck space. The ends of vent pipes shall terminate with U-bends and shall be fitted with flame screens or flame arrestors. The flame screens shall consist of a single screen of corrosion resistant wire of at least 30 x 30 mesh.

(i) *Gasoline tanks.* For requirements pertaining to gasoline tanks, see Subpart 59.05 of this subchapter.

§ 55.10–50 *Diesel fuel systems.*—(a) *Scope.* The piping shall comply with the requirements of §§ 55.10–35, 55.10–60 and 55.10–65, except as otherwise provided in this section.

(b) *Material and workmanship.* Fuel supply piping shall be of seamless steel or annealed seamless copper or brass pipe or tubing.

(c) *Installation.* The piping shall run in sight whenever practicable, protected from mechanical injury and effectively secured against vibration.

(d) *Shut-off valves.* Shut-off valves shall be installed in the fuel supply lines, one as close to each tank as practicable, and one as close to each fuel pump as practicable. Valves shall be accessible at all times.

(e) *Outlets and drains.* Outlets for drawing fuel or draining water from the fuel oil system are not permitted in engine compartment.

(f) *Filling pipe.* Tank filling pipes on motorboats and motorvessels of less than 100 gross tons and tank barges shall terminate on an open deck and shall be fitted with suitable shut-off valves, deck plugs, or caps.

(g) *Vent pipes.* Each tank shall be fitted with a vent pipe complying with § 55.10–45 (h).

(h) *Diesel fuel tanks.* For requirements pertaining to diesel fuel tanks see Subpart 59.10 of this subchapter.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.)

SUBPART 55.16—LIQUEFIED PETROLEUM GASES FOR COOKING AND HEATING

Subpart 55.16, consisting of §§ 55.16–1 to 55.16–20, inclusive, is amended to read as follows:

Sec.

55.16–1 Scope.
55.16–5 Definition.
55.16–10 Approvals.
55.16–15 Installation.
55.16–20 Ventilation of compartments containing gas-consuming appliances.
55.16–25 Odorization.
55.16–30 Operating instructions.
55.16–35 Markings.

AUTHORITY: §§ 55.16–1 to 55.16–35 issued under R. S. 4405, as amended, 4462, as amended 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

§ 55.16–1 *Scope.* (a) Liquefied petroleum gas may be used for cooking and heating on all vessels subject to inspection by the Coast Guard, except passenger vessels, provided the installation complies with the requirements of this subpart.

§ 55.16–5 *Definition.* (a) For the purpose of this subpart the term "liquefied petroleum gas" means any liquefied inflammable gas which is composed predominantly of hydrocarbons or mixtures of hydrocarbons, such as propane, propylene, butane, butylene, or butadiene, and which has a Reid [1] vapor pressure exceeding 40 pounds per square inch absolute at 100° F.

§ 55.16–10 *Approvals*—(a) *Gas appliances.* All gas-consuming appliances used for cooking and heating shall be of a type approved by the Commandant, and shall be tested and approved for liquefied petroleum gas service by the American Gas Association and shall bear the Approval Seal of the American Gas Association Testing Laboratories.

(b) *Cylinders.* (1) Cylinders in which liquefied petroleum gas is stored and handled shall be constructed, tested, and marked in accordance with Interstate Commerce Commission Specifications effective at the date of manufacture.

(2) All liquefied petroleum gas cylinders in service shall be periodically tested and marked with the retest date in accordance with the Interstate Commerce Commission regulations.

(3) Each cylinder shall be fitted with one or more safety relief devices approved as to type, size, pressure, setting and location, by the Bureau of Explosives in conformance with the Interstate Commerce Commission regulations.

(c) *Valves, regulators and vaporizers.* Each regulator, manifold valve assembly, cylinder valve, gauging device, relief valve, excess flow valve and shut-off valve, and vaporizer, when used, shall be tested and approved by, and bear the label of the Underwriters Laboratories, Inc., or other recognized testing laboratory.

(d) *Plan approval.* In triplicate, showing the location and installation of gas-burning appliances, cylinders, regulators, manifolds and all piping shall be submitted for approval by the Commandant.

§ 55.16–15 *Installation*—(a) *Cylinders.* (1) Cylinders shall be installed in a substantially constructed and firmly fixed metal inclosure located on or above the weather deck. The cylinder inclosure shall have access from the weather deck only. The inclosure shall be provided with top and bottom ventilation consisting of a fresh air inlet pipe and an exhaust pipe both entering through top of the inclosure. The inclosure shall be so constructed that when the access opening is closed, no gas can escape except through the ventilating system.

(2) Cylinders shall be securely fastened and supported within the metal inclosure. The cylinders shall be so mounted as to be readily accessible and capable of easy removal for refilling and inspection. Where possible, cylinders shall be mounted in an upright position.

(3) Storage of spare and empty cylinders shall be within the metal inclosure or they shall be properly checked on the weather deck.

(b) *Valves, regulators and vaporizers.* (1) A spring-loaded relief valve shall be installed in the system to protect the cylinders from excessive pressure. The relief valve shall comply with the requirements of § 55.16–10 (b) (3), and shall be located and vented within the metal inclosure.

(2) The low pressure side of all pressure regulators shall be protected against excessive pressure by means of a suitable relief valve which may be integral with or independent of the pressure regulator.

(3) All relief valve and regulator vents shall discharge into the metal inclosure.

(4) All valves, manifolds and regulators shall be securely mounted in locations readily accessible for inspection, maintenance and testing, and shall be adequately protected.

(5) Valves in the assembly of multiple cylinder systems shall be so arranged that the replacement of empty cylinders can be made without shutting down the flow of gas in the system.

(6) A shut-off valve shall be installed in each branch connection, located as close as possible to the gas-consuming appliances.

(7) The installation of vaporizers shall be subject to approval by the Commandant.

(c) *Piping and fittings.* (1) The piping between the cylinders and appliances shall be seamless annealed copper tubing or such other seamless tubing as may be approved by the Commandant.

(2) All piping shall be installed so as to provide minimum interior runs with adequate flexibility. The tubing connections shall be flared and the number held to a minimum. The piping at the cylinder outlets shall be fitted with flexible connections to minimize the effect of cylinder movement on the outlet piping.

(3) All piping or tubing shall be leak tested after installation as required by § 55.16–30 (j) and at each regular annual inspection at a pressure of not less than the normal operating pressure of the system. Tests may be made by qualified persons acceptable to the Officer in Charge, Marine Inspection, and one copy of the report of test shall be posted and the other forwarded to the Officer in Charge, Marine Inspection, where the test was made.

(d) *Electrical.* No electrical connections shall be made within the cylinder inclosure.

§ 55.16–20 *Ventilation of compartments containing gas-consuming appliances.* (a) Compartments containing gas-consuming appliances which are located above the weather deck shall be fitted with at least two natural ventilator ducts led from atmosphere and extending to the floor level and to the overhead of the compartment. Mechanical ventilation may also be provided.

(b) Where compartments in which gas-consuming appliances are located entirely below the weather deck, mechanical or power ventilation shall be provided with sufficient capacity to effect a change of air at least once every six minutes.

§ 55.16–25 *Odorization.* (a) All liquefied petroleum gases shall be effectively odorized by an agent of such character as to indicate positively, by a distinctive odor, the presence of gas down to concentration in air of not over one-fifth the lower limit of combustibility.

§ 55.16–30 *Operating instructions.* (a) Before opening a cylinder valve, the outlet of the cylinder shall be connected tightly to system; and in the case where only a single cylinder is used in the system, all appliance valves and pilots shall be shut off before the cylinder valve is opened.

(b) Before opening cylinder valve after connecting it to system, the cylinder shall be securely fastened in place.

(c) When cylinders are not in use their outlet valves shall be kept closed.

(d) Cylinders when exhausted shall have their outlet valves closed.

(e) Nothing shall be stored in the metal enclosure except liquefied petroleum gas cylinders and permanently fastened parts of the system.

(f) Valve protecting caps, if provided, shall be firmly fixed in place on all cylinders not attached to the system. Caps for cylinders in use may remain in the cylinder enclosure if rigidly fastened thereto.

(g) The opening to the cylinder enclosure shall be closed at all times except when access is required to change cylinders or maintain equipment.

(h) Gas pressure to consuming appliances should be approximately eleven inches water column (6.4 ounces per square inch).

(i) No smoking is permitted in the vicinity of the cylinder enclosure when access to inclosure is open.

(j) Tests for gas leaks should be made with a soap solution or low freezing point liquids but in no case shall a flame be used.

(k) Report any presence of gas odor to _____

§ 55.16–35 *Markings.* (a) The outside of the cylinder inclosure housing liquefied petroleum gas cylinders, valves and regulators shall be marked as follows:

Liquefied Petroleum Gas
Keep Open Fires Away.
Operating Instructions
Inside and In——

(b) Operating Instructions as listed in § 55.16–30 shall be framed under glass and shall be posted prominently, both in the interior of the metal enclosure and near the most frequently used gas consuming device, so they may be easily read.

[1] As determined by the American Society for Testing Materials Standard D–323 (most recent revision)—Method of Test for Vapor Pressure of Petroleum Products (Reid Method).

PART 56—ARC WELDING, GAS WELDING, AND BRAZING

SUBPART 56.01—ARC WELDING AND GAS WELDING

1. Sections 56.01–25 and 56.01–30 are amended to read as follows:

§ 56.01–25 *Classes of arc-welded pressure vessels.* For the purpose of the uniform application of the regulations in this subchapter, arc-welded pressure vessels shall be divided into three classes as given in Table 56.01–25.

TABLE 56.01–25.—PRESSURE VESSEL CLASSIFICATION

Class of pressure vessel	Service	Limitations		Maximum metal thickness, in inches
		Pressure, p. s. i.	Temperature, ° F.	
I	Power boilers: All pressure parts	Over 30	All	None
	Unfired pressure vessels containing:			
	(a) Vapors or gases	Over 600	Over 700	None
	(b) Liquids	Over [1] 600	Over 400	None
	(c) Dangerous substances	[2]	[2]	
II	Unfired pressure vessels containing:			
	(a) Vapors or gases	31 to 600, inclusive	276 to 700, inclusive	[3] 1¼
	(b) Liquids	201 to [1] 600, inclusive	251 to 400, inclusive	[3] 1⅛
	(c) Dangerous substances	[2]	[2]	
III	Heating boilers:			
	(a) Steam	30 and under	275 and under	
	(b) Hot water	30 and under	250 and under	
	Unfired pressure vessels containing:			
	(a) Vapors or gases [4]	30 and under	275 and under [5]	[3] ⅝
	(b) Liquids [4]	200 and under	250 and under [5]	[3] ⅝

[1] This pressure limitation does not apply to vessels containing liquids under hydrostatic pressure at atmospheric temperatures.

[2] Stored or stowed dangerous substances may be carried in either Class I or Class II pressure vessels within the pressure and temperature limits prescribed in Subchapter N (Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

[3] The limit of plate thickness does not apply to heads formed from a single plate.

[4] Class III pressure vessels shall not be used for the storage or stowage of lethal gases or liquids or such dangerous substances which are regulated by the requirements of Subchapter N (Explosives or other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

[5] Class III pressure vessels shall not be used for the storage or stowage of gases or liquids at temperatures exceeding their boiling point at atmospheric pressure.

§ 56.01–30 *Welded joint efficiencies.* (a) The maximum joint efficiencies to be used in the design of pressure vessels or parts of pressure vessels fabricated by arc or gas welding shall be as given in Table 56.01–30 (a). The joint efficiencies shall depend on the type of joint welded and on whether or not the pressure vessel is stress-relieved or radiographed.

(b) A maximum joint efficiency of 0.95 may be used for Class I pressure vessels provided the weld reinforcement is removed so that the longitudinal weld(s) on both sides of the joint is substantially flush with the surface of the plates, and on all intersecting butt-welded circumferential joints the reinforcement is similarly removed five times the plate thickness (or 6 inches whichever is less) on each side adjacent to any longitudinal joint.

TABLE 56.01–30 (a).—MAXIMUM ALLOWABLE EFFICIENCIES FOR WELDED JOINTS [1]

Type of joint	Limitations	Basic joint efficiency (percent) [2]	Radiographed	Thermally stress relieved	Maximum joint efficiency (percent)
Double-welded butt joint	None		R	R	[3] 95
	Class I welded pressure vessel	90	R	R	90
Single-welded butt joint with backing strip. [4]	Long. joint maximum thickness 1¼ inches. No thickness limitation on circumferential joints.	80	R	NR	85
	If welds not radiographed and stress-relieved this type joint limited to Class II and III welded pressure vessel.		NR	R	85
			NR	NR	80
Single-welded butt joint without backing strip. [5]	Circumferential joints only. Maximum thickness ⅝ inch. Limited to Class II and III welded pressure vessel.	70	NR	R	75
			NR	NR	70
Double-welded full-fillet lap joints.	Long. joints maximum thickness ⅜ inch. Circumferential joints maximum thickness ⅝ inch. Limited to Class III welded pressure vessel.	65	NR	R	70
			NR	NR	65

R—Indicates "Required."
NR—Indicates "Not Required."

[1] See § 56.01–25 for classes of welded pressure vessels and Subpart 56.10 for unfired brazed pressure vessel requirements.

[2] Spot examination required by § 56.05–6 unless specifically exempted.

[3] Weld reinforcement required to be removed (see § 56.01–30 (b)).

[4] Where not possible to employ double-welded butt joint the above type may be considered equivalent to a double-welded joint if the requirements of § 56.01–55 are met.

[5] In welding single-welded butt joints, complete penetration at the root is required, which must be demonstrated by the qualification of the procedure to be used. If complete penetration cannot otherwise be secured, the procedure shall include a backing ring or equivalent.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.)

2. Section 56.01–35 *Class III Welding* is cancelled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

SUBPART 56.05—TESTS AND INSPECTION

1. Section 56.05–5 (a) and (b) are amended to read as follows:

§ 56.05–5 *Nondestructive tests.* (a) All longitudinal and circumferential arc- or gas-welded butt joints of Class I welded pressure vessels shall be radiographically examined throughout their length except as specifically exempted in other sections of this subchapter. Butt-welded pipe joints may be tested either by radiography or by the magnetic powder method.

(b) All welded joints to be radiographed shall be prepared as follows: The weld ripples or weld surface irregularities, on both the inside and outside, shall be removed by any suitable mechanical process, to a degree such that the resulting radiographic contrast due to any remaining irregularities cannot mark or be confused with that of any objectionable defect. Also the weld surface shall merge smoothly into the plate surface. The finished surface of the reinforcement may have a crown of approximately uniform amount not to exceed the following:

Plate thickness, inches:	*Thickness of reinforcement, inches*
Up to ½, inclusive	1/16, maximum.
Over ½ to 1, inclusive	1/16 to 3/32.
Over 1	3/32 to ⅛.

Single-welded butt joints made the equivalent of double-welded butt joints in accordance with § 56.01–55, may be radiographed without removal of backing strip provided the backing strip image will not interfere with the interpretation of resultant radiographs.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4431, 4433, 4434, 53, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–409, 411, 412, 435, 489, 366, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275)

2. Section 56.05–10 *Hydrostatic and hammer tests* is cancelled.

(R. S. 4405, as amended, 4462, as amended, 46 U. S. C. 375, 416)

3. Section 56.05–15 *Inspection* is cancelled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 57—MAIN AND AUXILIARY MACHINERY

Part 57 is amended by changing the title from "Installations, Tests, Inspections, Repairs, and Miscellaneous Requirements" to "Main and Auxiliary Machinery"; §§ 57.01–1 to 57.20–20, inclusive, are cancelled; and §§ 57.01–1 to 57.20–5 are added reading as follows:

SUBPART 57.01—GENERAL REQUIREMENTS

Sec.
57.01–1 Scope.
57.01–5 Applicable standards.
57.01–10 Fuel for internal combustion engines on passenger vessels.

SUBPART 57.05—MAIN PROPULSION MACHINERY

57.05–1 Material, design and construction.
57.05–5 Astern power.

SUBPART 57.10—INTERNAL COMBUSTION ENGINE INSTALLATIONS

57.10–1 Scope.
57.10–5 Gasoline engine installations.
57.10–10 Diesel engine installations.

SUBPART 57.20—REFRIGERATING MACHINERY

Sec.
57.20–1 Installation of refrigerating machinery.
57.20–5 Small portable, self-contained units.

AUTHORITY: §§ 57.01–1 to 57.20–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4426–4431, 4433, 4434, 4453, 4491, as amended; sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 404–409, 411, 412, 435, 489, 366, 395, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 57.01—GENERAL REQUIREMENTS

§ 57.01–1 *Scope.* (a) The regulations in this part contain requirements for the design and construction of main and auxiliary machinery installed on vessels subject to inspection by the Coast Guard, except as otherwise prescribed in this subchapter.

§ 57.01–5 *Applicable standards.* In general the applicable standards established by the American Bureau of Shipping may be considered as standard for the design, construction, and testing of main and auxiliary machinery, except as modified in this subchapter.

§ 57.01–10 *Fuel for internal combustion engines on passenger vessels.* All internal combustion engines installed on passenger vessels exceeding 100 gross tons whether for propulsion or auxiliaries shall be driven by fuel having a flash point exceeding 110° F.

SUBPART 57.05—MAIN PROPULSION MACHINERY

§ 57.05–1 *Material, design and construction.* The material, design, construction and workmanship of main and auxiliary machinery shall be at least equivalent to the standards established by the American Bureau of Shipping or other recognized classification society.

§ 57.05–5 *Astern power.* All passenger vessels shall have sufficient power for going astern to secure proper control of the ship in all normal circumstances.

SUBPART 57.10—INTERNAL COMBUSTION ENGINE INSTALLATIONS

§ 57.10 *Scope.* The requirements in this subpart apply to all vessels subject to inspection. The requirements governing the installation of internal combustion engines on motorboats and motor vessels of more than 15 gross tons carrying passengers for hire shall be effective on new vessels or vessels converted to passenger service for the first time, the construction of which is commenced on or after December 1, 1945, and to all existing vessels as far as it is practicable.

§ 57.10–5 *Gasoline engine installations*—(a) *Engine design.* All installations shall be of marine type engines suitable for the intended service, designed and constructed in conformance with the requirements of this subchapter.

(b) *Carburetors.* (1) Drip collectors shall be fitted under all carburetors, except the down-draft type, to prevent fuel leakage from reaching the bilges and so arranged as to permit ready removal of such fuel leakage. Drip collectors shall be covered with flame screens.

(2) Carburetors of all engines shall be fitted with effective backfire flame arrestors. Backfire flame arrestors used on new installations or replacements shall be of approved type, design, construction and tested in conformance with Subpart 162.015 of Subchapter Q (Specifications) of this chapter. Air intakes shall be so directed that backfire cannot blow down into the bilge.

(c) *Exhaust manifold.* The exhaust manifold shall either be water-jacketed and cooled by discharge from a pump which operates whenever the engine is running, or woodwork within 9 inches shall be protected by ¼-inch asbestos board covered with not less than No. 22 USSG galvanized sheet iron or nonferrous metal. A dead air space of ¼ inch shall be left between the protecting asbestos and the wood, and a clearance of not less than 2 inches maintained between the manifold and the surface of such protection.

(d) *Exhaust pipe.* (1) The exhaust pipe shall be gas tight and the installation shall comply with one of the following requirements:

(i) All of the engine cooling water shall be discharged through the exhaust pipe when water cooled and shall enter the exhaust pipe at a point as near to the manifold as practicable.

(ii) A length of not less than 12 diameters of the exhaust pipe adjacent to the manifold shall be water-jacketed and cooled in the same manner as the manifold. The remainder of the pipe shall be kept clear of internal woodwork at least 1½ inches.

(iii) Woodwork within 6 inches of any part of the exhaust pipe shall be protected by ¼-inch asbestos board covered with not less than No. 22 USSG galvanized sheet iron or nonferrous metal. A dead air space of ¼ inch shall be left between the protecting asbestos and the wood, and a clearance of not less than ½ of its diameter shall be maintained between the pipe and the surface of such protection.

(2) In all of the above cases described in subparagraph (1) of this paragraph, the exhaust pipe shall be properly supported by noncombustible hangers or blocks and protective gratings shall be provided at such locations where persons or gear might come in contact therewith. Arrangements shall be made to provide access to the exhaust pipe throughout its length. A spark arrester shall be installed in each exhaust line.

(3) Where exhaust lines pass through watertight bulkheads, noncombustible packings shall be installed. Exhaust piping shall be led to the point of escape without traps and with a minimum number of bends and elbows. 90 degree elbows or bends of less than 5 diameters radius are not permitted.

(4) Where flexibility is necessary a section of flexible metallic hose, or suitable nonmetallic hose may be used if the exhaust is water cooled.

§ 57.10–10 *Diesel engine installations.* (a) The requirements of § 57.10–5 (a), (c) and (d) shall apply to diesel engine installations.

(b) On installations of engines of the semi-diesel or hot-bulb type, woodwork within 3 feet of starting torches shall be protected by at least ¼-inch asbestos board covered with sheet metal and a dead air space of ¼ inch between the asbestos board and the wood.

SUBPART 57.20—REFRIGERATING MACHINERY

§ 57.20–1 *Installation of refrigerating machinery.* (a) Where refrigerating machines are installed in which anhydrous ammonia is used as a refrigerant, such machines shall be located in a well-ventilated, isolated compartment, preferably on the deck, but in no case shall it be permissible to install such machines in the engine-room space unless it is vented and isolated so as to eliminate any hazard from gas escaping to the engine room. Absorption machines using a solution of aqua ammonia and machines using carbon anhydride (CO_2 gas) are exempt from this requirement, provided the maximum charges that might be released in the event of breakage do not exceed 300 pounds.

(b) Machinery compartments containing equipment for ammonia shall be fitted with a sprinkler system providing an effective water spray and having a remote control device located outside the compartment.

(c) All refrigeration compressor spaces shall be effectively ventilated and drained and shall be separated from the insulated spaces by watertight bulkhead, unless otherwise approved.

§ 57.20–5 *Small portable, self-contained units.* The requirements of this subpart shall not apply to small, portable, self-contained units.

PART 58—REPAIRS TO BOILERS, UNFIRED PRESSURE VESSELS AND APPURTENANCES

Part 58 is amended to read as follows:

SUBPART 58.01—GENERAL REQUIREMENTS

58.01–1 Scope.
58.01–5 Repairs, replacements, or alterations.

SUBPART 58.05—WELDING REPAIRS TO NEW PRESSURE VESSELS

58.05–1 Welding repairs when plate defects develop or are discovered during fabrication.

SUBPART 58.10—WELDING REPAIRS TO BOILERS AND UNFIRED PRESSURE VESSELS IN SERVICE

58.10–1 Scope.
58.10–5 Cracks.
58.10–10 Corroded surfaces.
58.10–15 Rivets and staybolts.
58.10–20 Patches in shells and tube sheets.
58.10–25 Stayed areas.
58.10–30 Seal welding.
58.10–35 Wrapper plates and back heads.

SUBPART 58.15—MISCELLANEOUS BOILER REPAIRS

58.15–1 Furnace repairs.
58.15–5 Stayed furnaces and combustion chambers.
58.15–10 Bagged or blistered shell plates.

SUBPART 58.20—WELDING REPAIRS TO CASTINGS

58.20–1 Welding repairs to defective carbon-steel castings.
58.20–5 Welding repairs to defective alloy-steel castings.

AUTHORITY: §§ 58.01–1 to 58.20–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or

apply R. S. 4399, 4400, 4417, 4417a, 4418, 4426–4431, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 404–409, 411, 412, 435, 489, 366, 395, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 58.01—GENERAL REQUIREMENTS

§ 58.01–1 *Scope.* The regulations in this part apply to the repairs of all boilers, unfired pressure vessels and appurtenances subject to inspection by the Coast Guard.

§ 58.01–5 *Repairs, replacements, or alterations.* (a) No repairs, replacements or alterations, except emergency repairs, etc., shall be made to machinery boilers, unfired pressure vessels, their mountings or internal fittings, safety valves, piping systems, or pressure appliances without prior approval by the Officer in Charge, Marine Inspection.

(b) Emergency repairs, replacements, or alterations shall be reported as soon as practicable to the Officer in Charge, Marine Inspection, at or nearest the first port where the vessel may call after such repairs are made.

(c) Repairs, replacements, or alterations to installations in service shall so far as practicable be made with materials and in the manner specified for new construction.

SUBPART 58.05—WELDING REPAIRS TO NEW PRESSURE VESSELS

§ 58.05–1 *Welding repairs when plate defects develop or are discovered during fabrication—(a) Cracked plates.* Plates which crack during cold forming operations as a result of localized stress raisers such as sharp plate edges, minor localized surface imperfections, and fractures which subsequent microstructure shows to be caused by coarse grain size may be repaired if authorized by the Commandant. Prior to such repairs being authorized, information shall be furnished as follows:

(1) Heat treatment to be employed prior to undertaking repairs.

(2) Method of excavating defective material and type of groove to be employed.

(3) Method of examining excavation to insure that all defective material has been removed.

(4) Welding procedure to be employed in effecting the repair.

(5) Heat treatment to be employed during and after welding.

(6) Type of nondestructive test to be made to insure that repair is satisfactory.

(b) *Laminations.* Laminations or inclusions in the plate which initially appear in the heat affected zone during welding operations or appear during the drilling of tube holes may be repaired if authorized by the Commandant. Prior to such repairs being authorized information shall be furnished as follows:

(1) Method of excavating defective material and type of welding groove to be used if any.

(2) Method of examining excavation to insure that all defective material has been removed.

(3) Welding procedure to be employed in effecting repair.

(4) Heat treatment to be employed during and after welding.

(5) Type of nondestructive test to be made to insure that repair is satisfactory.

SUBPART 58.10—WELDING REPAIRS TO BOILERS AND UNFIRED PRESSURE VESSELS IN SERVICE

§ 58.10–1 *Scope.* (a) Repairs to boilers or unfired pressure vessels in service may be performed by welding provided the welding meets the applicable requirements of Part 56 of this subchapter. No repairs by welding shall be made, except temporary emergency repairs, without the prior approval of the Officer in Charge, Marine Inspection. Emergency repairs shall be replaced with permanent repairs meeting the requirements of this subchapter when the vessel returns to a port in which an Officer in Charge, Marine Inspection, is located, except in the case of minor repairs which in the opinion of the Officer in Charge, Marine Inspection, do not materially affect the safety of the boiler or pressure vessel.

(b) Repair welding of power boilers not meeting requirements for class I welded pressure vessels is prohibited unless the stress is carried by such other type(s) of construction complying with the requirements of this subchapter, and where the adequacy of the boiler design is not solely dependent upon the strength of the welds.

(c) Only welded repairs as specified in this subchapter are permitted on boilers and unfired pressure vessels. The welding repairs allowed by this subpart apply only to boilers and unfired pressure vessels fabricated of carbon steel. Welding repairs to boilers and unfired pressure vessels fabricated of alloy steel will be given special consideration by the Commandant. Such other method of repairs by means of welding not covered in this subchapter shall be referred to the Commandant and may be authorized by him if, in his opinion, it meets the intent of this subchapter.

§ 58.10–5 *Cracks.* (a) Cracks extending from the calking edge of plates to the rivet holes of circumferential joints may be welded provided the cracks are veed out so that complete penetration of the weld metal is secured.

(b) Circumferential cracks from rivet hole to rivet hole in girth joints may be welded provided there are not more than three consecutive cracked ligaments nor more than a total of six cracked ligaments in any one girth joint.

(c) Cracks in staybolted plates may be welded provided they are located entirely within staybolted areas and the total length of any crack or series of consecutive cracks does not exceed two staybolt pitches.

(d) Cracks in plain, circular or Adamson ring or similar type furnaces may be welded provided any one crack does not exceed 12 inches in length and after completion the weld is stress-relieved as required by § 56.01–70 of this subchapter. Cracks in corrugated furnaces may be repaired by welding provided any one crack does not exceed 20 inches in length.

(e) Fire cracks may be welded at riveted door openings extending from the edge of the plate, but not more than 2 inches beyond the centerline of the rivet holes.

(f) Cracks may be welded between tube holes in the shell of water-tube boiler drums, provided there are not more than two cracks in any one row in any direction, nor more than a total of four cracks in a drum, and further provided the welding meets the requirements of this subchapter for class I welded pressure vessels and is approved by the Commandant.

(g) All cracks permitted to be repaired under this subpart shall be excavated to sound metal by grinding, flame gouging or chipping out the defective metal to form a clean welding groove. The first two methods of excavation are preferable, either a V groove or U groove wherein complete penetration of the weld metal is secured may be used. After excavation is completed and prior to welding, the excavated area shall be examined by magnetic particle testing to insure that the entire crack was excavated. When the reverse side of the weld is accessible the root of the weld shall be chipped or ground out to insure a clean surface of the originally deposited metal and the resultant groove welded to obtain a sound weld having complete penetration. During welding a preheat of 200 degrees plus or minus 50 degrees F. shall be maintained by controlled temperature. For thicknesses exceeding ¾ inch, suitable U grooves should be employed. A welding sequence shall be used so as to equalize welding stresses. Each complete bead of welding except the last shall be peened before depositing the succeeding bead.

(h) After cracks originating in tube or rivet holes are repaired by welding, the holes shall be properly reamed and the weld reinforcing ground flush with the plate in way of rivet heads.

(i) Flat tube sheets in fire-tube boilers which have corroded or where cracks exist in the ligaments may be repaired by welding.

(j) The welding repairs to drums of power boilers, except as otherwise permitted in this subpart, is prohibited.

§ 58.10–10 *Corroded surfaces.* (a) Corroded surfaces in the calking edges of circumferential seams may be built up by welding to the original thickness under the following conditions:

(1) The thickness of the original metal to be built up between rivet holes and calking edge shall not be less than one-fourth of the diameter of the rivet hole, and the portion of the calking edge to be thus reinforced shall not exceed 30 inches in length in a circumferential direction.

(2) In all repairs to circumferential seams by welding, the rivets shall be removed over the portions to be welded for a distance of at least 6 inches beyond the repaired portion.

(3) After repairs are made the rivet holes shall be reamed before the rivets are re-driven.

(b) It is not permissible to build up or reinforce a grooved or corroded area of unstayed internal surfaces by means of welding, except that widely scattered pit holes may be built up by welding.

(c) Where external corrosion has reduced the thickness of flat plates around hand holes to an extent of not more than 40 percent of the original thickness and for a distance not exceeding 2 inches from the edge of the hole, the plate may be built up by welding.

(d) Where stayed sheets have corroded to a depth not exceeding 40 percent of their original thickness, they may be reinforced or built up by welding. Where the staybolts are fitted with riveted heads, the staybolts in the reinforced area shall be renewed in accordance with the provisions of Subparts 52.30 and 52.35 of this subchapter, but where the staybolts are fitted with nuts, the nuts may be removed and after reinforcing has been applied, collars may be welded around the staybolts in lieu of the nuts. Such reinforced areas shall not exceed 400 square inches nor more than 30 inches in one direction. Two such areas in any one plate may be reinforced: *Provided*, That the distance between the reinforced surfaces is not less than 30 inches.

(e) When the corroded portion of a staybolted surface exceeds 400 square inches, it is permissible to repair the same by cutting out the defective portion and replacing it with a new plate, the edges of the new plate to be welded in position. In such cases, new staybolts shall be fitted in accordance with the requirements of Subparts 52.30 and 52.35 of this subchapter and where welding is performed through a line of staybolts, welded collars as required by Figure 52.35–1 of this subchapter shall be used to attach the staybolts.

§ 58.10–15 *Rivets and staybolts.* (a) It is not permitted to reinforce or build up by welding the heads of rivets or staybolts that have deteriorated. Such rivets or staybolts shall be replaced. The seal welding of rivet heads to secure tightness is prohibited.

(b) Where leaks develop around staybolts which are otherwise in good condition, the nuts may be replaced with a beveled collar formed around the end of the stay by means of welding. In such cases, the depth of collar measured on the stay and the width measured on the plate, shall be equal to one-half the diameter of the staybolt. (See Figure 52.35–1 of this subchapter.)

§ 58.10–20 *Patches in shells and tube sheets.* (a) Unreinforced openings in the shells or drums of boilers or pressure vessels, the diameter of which does not exceed the maximum diameter of an unreinforced opening, in accordance with Figures 52.25–15 (b1) and 52.25–15 (b2) of this subchapter, may be closed by the use of a patch or plate inside the drum or shell and sealed against leakage by welding. Such plates shall have a diameter of at least 2 inches larger than the diameter of the hole and shall have a thickness equal to the thickness of the plate to which it is attached. It is not permissible to insert such patches in the shell or head flush with the surrounding plate unless the requirements of this subchapter for Class I welded pressure vessels are met.

(b) Portions of tube sheets which have deteriorated may be renewed by replacing the wasted portion with a new section. The ligaments between the tube holes may be joined by means of welding and staytubes, or other acceptable means of lowering the stress on the repaired section may be installed if in the judgment of the Officer in Charge, Marine Inspection, it is necessary.

(c) The edge preparation and preheat of butt-welded joints employed in the renewal of defective or corroded boiler plates shall comply with the requirements of § 58.10–5 (g).

§ 58.10–25 *Stayed areas.* Welding repairs are permitted in staybolted areas or areas adequately stayed by other means so that should failure of the welds occur the stress will be carried by stays. The welds shall be located entirely within staybolted areas which prohibit welds passing through the outer row of stays.

§ 58.10–30 *Seal welding.* Where leaks occur in riveted joints or connections, they shall be carefully investigated to determine the cause. Such leaks may be made tight by seal welding the edge, if, in the opinion of the Officer in Charge, Marine Inspection, this will make a satisfactory repair.

§ 58.10–35 *Wrapper plates and back heads.* Wrapper plates and back heads may be renewed in whole or repaired as follows:

(a) Wrapper plates or back heads shall be cut between two rows of staybolts or on a line of staybolts where the thickness is approximately the same as the original construction. If welding is employed on a line of staybolts, the staybolts shall be fitted with a welded collar as required in Figure 52.35–1 of this subchapter.

(b) The edges of wrapper plates riveted to tube sheets and back heads shall be removed by cutting out the rivets.

(c) The edges of existing plates and new plates shall be beveled by chipping, flame cutting, or grinding so as to form a suitable groove whereby complete penetration of the weld metal will be obtained. The edge preparation and preheat shall comply with the requirements of § 58.10–5 (g).

(d) The edges of the new plate shall be butt-welded and the plate shall be riveted to the flanges of the tube sheet and back heads and the staybolts renewed.

(e) Sections of wrapper plates of combustion chambers outside of stayed areas may be repaired by welding provided the welded joints are stress-relieved by means of controlled heat and the joints are nondestructively tested.

SUBPART 58.15—MISCELLANEOUS BOILER REPAIRS

§ 58.15–1 *Furnace repairs.* (a) Where corrugated or plain furnaces or flues are distorted to a difference of 1½ inches in diameter (that is 1½-inch deviation from a true circle), they shall be forced back to a true circular shape, and the Officer in Charge, Marine Inspection, may require strong-backs or other acceptable means of support to hold the furnace from future collapse if in his opinion such action is necessary.

(b) Where the distortion is in excess of 1½ inches, the furnace shall be forced back to practically a true circle or adequately stayed as found necessary in the judgment of the inspector.

(c) Where the distortion does not exceed 1½ inches it will not be necessary to force the furnace back to a true circle if the allowable pressure is reduced in the ratio of 1½ percent for each 1/10 of an inch that the furnace is out of round. However, if the maximum distortion does not exceed 1 inch and the length of the distorted area is not more than three corrugations, or if the maximum distortion does not exceed ¾ inch for a length greater than three corrugations of distorted area, the repairs or reduction in pressure will not be required unless considered necessary by the inspector.

(d) When it becomes necessary to rivet a patch to a furnace or other part of the heating surface, the riveted patch shall be placed on the water side of the plate in order not to form a pocket in which sediment may collect.

(e) Furnace crowns which have become distorted, not in excess of the limitations provided in paragraph (c) of this section, may be repaired by pumping back the distorted section to as nearly a true circle as possible and reinforcing the same by means of a ring, arc or gas welded to the distorted corrugation as shown in Figure 58.15–1 (e), the welding to be done by qualified welders using acceptable welding electrodes in accordance with § 56.01–20 of this subchapter.

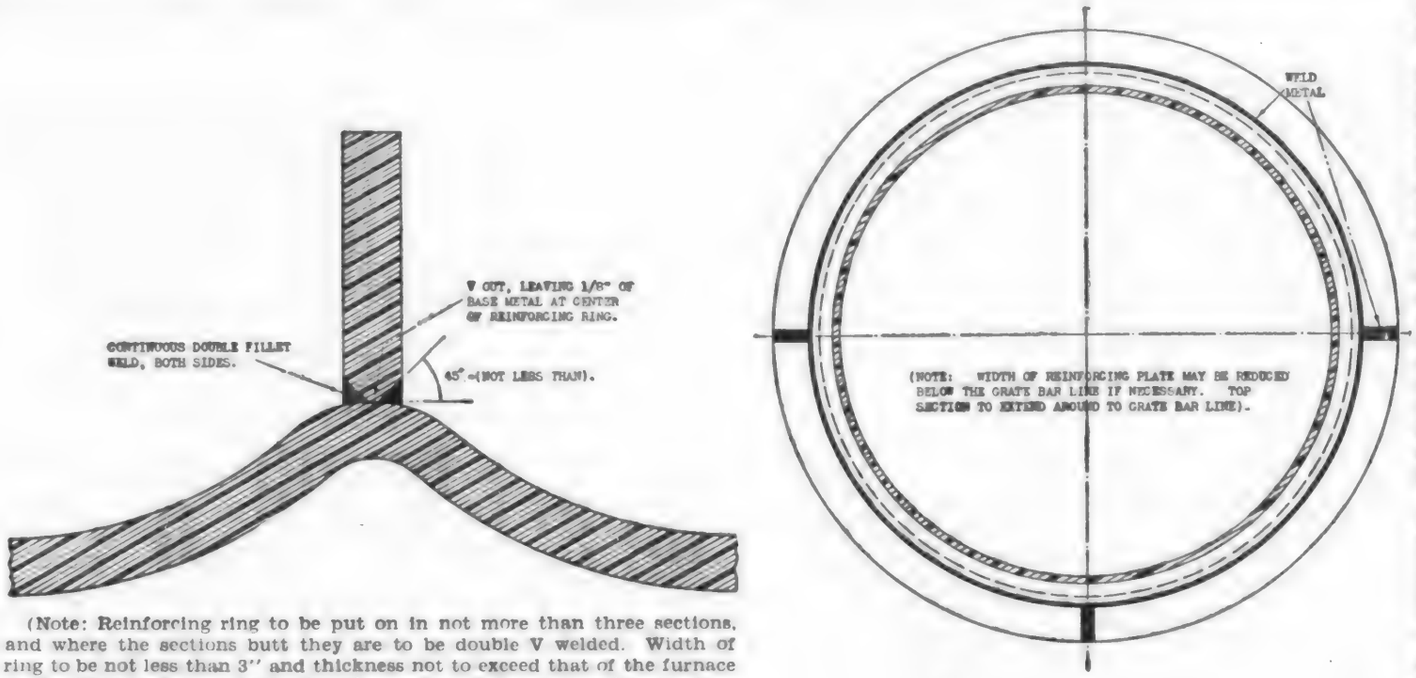
§ 58.15–5 *Stayed furnaces and combustion chambers.* (a) Where the plate forming the walls of stayed furnaces or combustion chambers becomes bulged between staybolts, repairs may be made by inserting an additional staybolt in the center of such space supported by the four staybolts.

(b) Where it is desired to rivet a patch to the wall of a stayed furnace or combustion chamber, the defective portion of the plate shall be cut away until solid material is reached, the patch shall be riveted on the water side, and the staybolts renewed, and extended through the new plate.

§ 58.15–10 *Bagged or blistered shell plates.* (a) When the shell plates of cylindrical boilers which are exposed to the radiant heat of the fire become bagged or blistered, it shall be the duty of the chief engineer in charge of the vessel to notify the Officer in Charge, Marine Inspection, for examination before raising steam on the boiler.

(b) Where the shell plate is bagged due to overheating, the Officer in Charge, Marine Inspection, may, if in his judgment it is practicable, permit the same to be driven back to its original position.

(c) Where the shell plate has blistered, bagged, or bulged to such an extent that there is an appreciable thinning of the plate, the Officer in Charge, Marine Inspection, shall require the defective portion to be cut away and the shell repaired by fitting a patch of steel plate conforming to the requirements of Subpart 51.04 of this subchapter in place of the defective portion, care being taken that the riveting schedule of the patch is so arranged as to give the plate sufficient strength to withstand the stress placed on it in service.


V CUT, LEAVING 1/8" OF BASE METAL AT CENTER OF REINFORCING RING.
CONTINUOUS DOUBLE FILLET WELD, BOTH SIDES.
45°-(NOT LESS THAN).
WELD METAL
(NOTE: WIDTH OF REINFORCING PLATE MAY BE REDUCED BELOW THE GRATE BAR LINE IF NECESSARY. TOP SECTION TO EXTEND AROUND TO GRATE BAR LINE).

(Note: Reinforcing ring to be put on in not more than three sections, and where the sections butt they are to be double V welded. Width of ring to be not less than 3" and thickness not to exceed that of the furnace shell. Welding to end flush with the surface of the ring and to be done by a welding operator duly qualified.)

FIGURE 58.15-1 (e)—Approved method of reinforcing furnace crowns by means of arc or gas welding.

SUBPART 58.20—WELDING REPAIRS TO CASTINGS

§ 58.20-1 *Welding repairs to defective carbon-steel castings.* (a) Defects in carbon-steel castings, such as valve bodies, pipe fittings, channels, covers, manifolds, and other pressure-containing appliances, may be repaired by arc or gas welding.

(b) Defects in carbon-steel castings shall be classed as follows:

(1) *Minor defects.* Minor defects are undersized defective areas resulting from oxyacetylene cutting, grinding, or chipping during cleaning operation, surface sand or slag defects or other slight surface defects except cracks or cold shuts. The excavated depth of a minor defect shall not exceed 20 percent of the wall thickness or 1 inch, whichever is the lesser. No lineal dimension shall exceed four times the wall thickness or be greater than 6 inches, whichever is the lesser.

(2) *Major defects.* All defects exceeding the depth or size given in subparagraph (1) of this paragraph shall be considered a major defect, which shall be repaired in the same manner as a minor defect. Repairs of major defects shall be nondestructively tested as required by paragraph (h) of this section.

(c) Prior to any welding being done, all defective material shall be removed until the base metal is shown to be sound. Defective areas of castings may be removed by chipping, grinding, drilling, or oxyacetylene grooving to a sufficient depth to insure that the remaining base metal is shown to be sound by acid etching, radiography, or magnetic particle testing. The latter methods of testing are preferred. Any slag remaining after oxyacetylene grooving shall be completely removed by chipping or grinding. When defects are removed by drilling, the resulting hole shall be countersunk to a depth of at least 25 percent of the metal thickness with a bevel of the included angle being not less than 45 degrees.

(d) Prior to any welding being done, the cavity and the adjoining area shall be preheated to a temperature suitable for the chemical elements and thickness of metal involved which experience indicates is satisfactory. Castings shall be preheated to a temperature which experience indicates is suitable for the chemical elements and thickness of the casting when lugs, supports, ribs, or bosses are to be welded thereto.

(e) Castings other than those which have been repaired for minor surface defects, the excavated dimensions of which do not exceed the limitations specified by subparagraph (b) (1) of this section, shall be stress-relieved in a furnace to a temperature of from 1,100° F. to 1,200° F. for 1 hour per inch of maximum thickness and allowed to cool in the furnace to 500° F. before removal.

(f) Filler metal used in the repair of defective steel castings shall be acceptable electrodes in accordance with § 56.01-20 of this subchapter and shall meet the chemical and physical properties of the base metal.

(g) The defective material removed shall be replaced using pipe welders qualified in accordance with Qualification Test No. 4 for the position in which the welding is to be done as given in § 56.01-10 of this subchapter. The use of welders qualified to weld plate shall be permitted provided the welding is done in the flat position.

(h) Completed welds shall be inspected for cracks and other defects by magnetic particle testing, and in the case of major repairs, the welded area shall be examined by radiography if the casting is to be used in steam lines subject to boiler pressure, boiler feed, or blow-off lines. Prior to the use of magnetic particle inspection, the welds shall be made smooth and free of grooves or depressions.

(i) After repair of defective castings has been completed a hydrostatic test as outlined in Table 55.07-15 (e12) or 55.07-15 (e13) of this subchapter based upon the primary service pressure rating shall be applied.

§ 58.20-5 *Welding repairs to defective alloy-steel castings.* Defects in alloy-steel castings may be repaired by arc or gas welding in accordance with the requirements of § 58.20-1, provided the preheat and postheat employed are satisfactory for the material to be welded and process approval tests are conducted. The heat treatment and process approval tests shall be acceptable to the Commandant.

PART 59—INDEPENDENT INTERNAL COMBUSTION ENGINE FUEL TANKS

Part 59 is amended to read as follows:

SUBPART 59.01—GENERAL REQUIREMENTS

Sec.
59.01-1 Scope.

SUBPART 59.05—GASOLINE FUEL TANKS

59.05-1 Construction.
59.05-5 Installation.
59.05-10 Tests.

SUBPART 59.10—DIESEL FUEL TANKS

59.10-1 Construction.
59.10-5 Installation.
59.10-10 Tests.

AUTHORITY: §§ 59.01-1 to 59.10-10 issued under R. S. 4405, as amended, 4462, as amended, 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4426-4433, 4434,

4453, 4491, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 404–409, 411, 412, 435, 489, 366, 395, 363, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 59.01—GENERAL REQUIREMENTS

§ 59.01–1 *Scope.* (a) The regulations in this part contain requirements for independent internal combustion engine fuel tanks, on all vessels subject to inspection by the Coast Guard and on all motorboats and motor vessels of more than 15 gross tons carrying passengers for hire.

(b) Passenger vessels exceeding 100 gross tons constructed prior to July 1, 1935, may carry gasoline as fuel not exceeding 40 gallons to supply the emergency electrical system. Passenger vessels exceeding 100 gross tons constructed on or after July 1, 1935, and all emergency systems converted on or after July 1, 1935, shall use diesel fuel for internal combustion engine units. Such vessels may carry a sufficient quantity of diesel fuel to supply the emergency electrical system.

(c) An outage of 2 percent shall be provided on all fuel tanks containing petroleum products.

SUBPART 59.05—GASOLINE FUEL TANKS

§ 59.05–1 *Construction.* (a) Tanks may be of either cylindrical or rectangular form, except that tanks for emergency electrical systems shall be of cylindrical form.

(b) Tanks shall be designed to withstand the maximum head to which they may be subjected in service, except that in no case shall the thickness of the shell or head be less than ⅛ inch.

(c) Tanks shall be constructed of wrought iron, steel or nonferrous material, or corrosion-resistant alloys suitable for the purpose. Tanks constructed of noncorrosion resistant materials less than 3/16 inch in thickness shall be galvanized by the hot-dipped process both inside and outside.

(d) Joints shall be riveted, brazed or welded, except that soldered joints may be used on small tanks of 20 gallons or less capacity, provided the solder used has a melting point of not less than 800° F.

(e) All nozzle connections shall be made to the top of the tank and shall be securely riveted, welded, brazed or soldered to the tank.

(f) No tubular gauge glasses or try-cocks shall be fitted to the tanks.

(g) Tanks shall be provided with swash plates and braces, where necessary. The material used shall be the same as the tank.

§ 59.05–5 *Installation.* (a) Gasoline fuel tanks used for propulsion shall be located in watertight compartments separate from, but adjacent to the engine room or machinery space. Fuel tanks for auxiliaries shall be located on or above the weather deck outside of the engine housing or compartment and as close to the engine as practicable. All tanks shall be so installed as to provide a free circulation of air around the tanks.

(b) Cylindrical tanks with longitudinal seams shall be arranged horizontally where practicable so that such seams are located as near the top as possible.

(c) All tanks shall be securely fastened and shall be arranged as to be readily inspected or movable for inspection. Portable fuel tanks are not permitted.

§ 59.05–10 *Tests.* (a) Tanks vented to atmosphere shall be hydrostatically tested to a pressure of at least 10 pounds per square inch gage after installation.

(b) All tanks not vented to atmosphere shall be constructed and tested in accordance with Part 54 of this subchapter.

SUBPART 59.10—DIESEL FUEL TANKS

§ 59.10–1 *Construction.* (a) Tanks may be of either cylindrical or rectangular form.

(b) Tanks shall be designed to withstand the maximum head to which they may be subjected in service, except that in no case shall the thickness of tanks having capacities of 40 gallons or less be less than 1/16 inch, and tanks having capacities over 40 gallons be less than ⅛ inch.

(c) Joints shall be riveted, brazed, or welded, except that soldered joints may be used on small tanks of 20 gallons or less capacity provided that the solder used has a melting point of not less than 800° F.

(d) Tanks shall be provided with swash plates and braces where necessary. The material used shall be the same as the tank.

(e) All nozzles for pipe connections shall be securely riveted, welded, and brazed, or soldered to the tank. No tubular gage glasses or try-cocks shall be fitted to the tanks.

§ 59.10–5 *Installation.* (a) Tanks containing fuel for emergency lighting units shall be located on an open deck or in an adequately ventilated metal compartment. No tank shall be located in a compartment where the temperature may exceed 150° F.

(b) When cylindrical tanks are installed, longitudinal seams shall be located as near the top of the tank as possible.

(c) The tanks shall be properly secured and accessible for inspection.

§ 59.10–10 *Tests.* (a) Tanks vented to atmosphere shall be tested to a hydrostatic pressure of 5 pounds per square inch gage after installation, and at least to the maximum height the liquid may rise in the vent, whichever is greater.

(b) All tanks not vented to atmosphere shall be constructed and tested in accordance with Part 54 of this subchapter.

PART 60—BOATS, RAFTS, BULKHEADS, AND LIFESAVING APPLIANCES (COASTWISE)

Part 60 is canceled.

(R. S. 4405 as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 61—INSTALLATIONS, TESTS, INSPECTIONS, MARKINGS, AND OFFICIAL FORMS

Part 61 is amended to read as follows:

SUBPART 61.01—GENERAL REQUIREMENTS

Sec.
61.01–1 Scope.

SUBPART 61.05—INSTALLATIONS

61.05–1 Scope.
61.05–5 Foundations.
61.05–10 Protection of adjacent structure.
61.05–15 Dampers.
61.05–20 Machinery guards.

SUBPART 61.10—INITIAL AND PERIODIC VESSEL INSPECTION

61.10–1 Scope.
61.10–5 Requirements for steam-propelled motorboats.

SUBPART 61.15—TESTS AND INSPECTION OF MACHINERY AND EQUIPMENT

61.15–1 Special surveys for unclassed passenger vessels.
61.15–5 Tests and inspection of steering gear.
61.15–10 Trial-trip observance.
61.15–15 Tail shaft survey.

SUBPART 61.20—TESTS AND INSPECTION OF BOILERS

61.20–1 Boilers under construction.
61.20–5 Preparation of boilers for inspection and test.
61.20–10 New boilers.
61.20–15 Boilers in service.
61.20–20 Boiler mountings and attachments.
61.20–25 Boilers of foreign-built vessels admitted to American registry.

SUBPART 61.25—TESTS AND INSPECTIONS OF PRESSURE VESSELS

61.25–1 Scope.
61.25–3 Welded pressure vessels under construction.
61.25–5 New pressure vessels.
61.25–10 Hydrostatic test of riveted pressure vessels.
61.25–15 Hydrostatic test of welded and brazed pressure vessels.
61.25–20 Pressure vessels in service.

SUBPART 61.30—TESTS AND INSPECTION OF PIPING, VALVES AND FITTINGS

61.30–1 Scope.
61.30–5 Shop test.
61.30–10 Installation test.
61.30–15 Piping in service.
61.30–20 Sea chests, sea valves and strainers.

SUBPART 61.35—PROOF HYDROSTATIC TESTS

61.35–1 Hydrostatic tests of boilers and appurtenances to determine pressure rating.
61.35–5 Proportional limit method.

SUBPART 61.40—MARKINGS

61.40–1 Boilers.
61.40–5 Unfired pressure vessels.

SUBPART 61.45—OFFICIAL FORMS

61.45–1 Scope.
61.45–5 Form CG 2935; boiler data report; manufacturer's certification.
61.45–10 Form CG 2936; unfired pressure vessel data report; manufacturer's certification.
61.45–15 Form CG 935A; Affidavit of manufacturer of class B material or appliances.
61.45–20 Form CG 945; report of chief engineer on fusible plugs inserted in boiler.

AUTHORITY: §§ 61.01–1 to 61.45–20 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4426–

4431, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 404–409, 411, 412, 435, 489, 366, 395, 363, 367, 536p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 61.01—GENERAL REQUIREMENTS

§ 61.01–1 *Scope.* The regulations in this part apply to the installations, tests and inspections of all boilers, pressure vessels and machinery subject to inspection by the Coast Guard.

SUBPART 61.05—INSTALLATIONS

§ 61.05–1 *Scope.* The regulations in this subpart apply to the installations of machinery and pressure vessels installed on vessels subject to inspection by the Coast Guard.

§ 61.05–5 *Foundations.* (a) Drawings showing details of proposed foundations, or saddles, for boilers and the proposed means of bracing boilers in the vessel shall be submitted for approval to the Officer in Charge, Marine Inspection, in the district where the installation is being made.

(b) Provision shall be made in foundations for expansion of the boilers when heated.

(c) Boilers shall be provided with chocks to prevent movement in the event of collision unless a bolted or riveted construction satisfactorily provides for this contingency.

§ 61.05–10 *Protection of adjacent structure.* (a) Boilers shall be so placed that all parts may be readily accessible for inspection and repair.

(b) In vessels having a double bottom or other extensive surfaces directly below the boiler, as in the case of keels and girders in wooden vessels, the distance between such surface and a boiler shall in no case be less than 8 inches at the lowest part of a cylindrical boiler and not less than 18 inches under the pans of water-tube boilers.

(c) In certain types of vessels where the boiler foundation forms the ash pit, such foundations shall be efficiently ventilated, except in cases where the ash pit is partially filled with water at all times.

(d) The pans of oil-burning, water-tube boilers shall be arranged to prevent oil from leaking into the bilges and shall be lined with fire brick or other heat resisting material.

(e) In vessels constructed of wood or having wood structure adjacent to boilers or uptakes such structure shall be protected by noncombustible, nonconducting material covered with sheet metal, and the distance between the wooden structure and the uptakes and funnels shall in no case be less than 12 inches.

(f) The distance between a boiler and a compartment containing fuel oil shall not be less than 24 inches at the back end of a boiler and 18 inches elsewhere, except that for a cylindrical part of a boiler or a knuckle in the casing of a water-tube boiler, these distances may be reduced to 18 and 12 inches, respectively, provided the requirements of paragraph (a) are complied with.

(g) All oil-burning boilers shall be provided with oil-tight drip pans under the burners and elsewhere where necessary to prevent oil draining into the bilges.

§ 61.05–15 *Dampers.* Where dampers are installed in the uptakes or funnels, the arrangement shall be such that it will not be possible to shut off the gas passages from the operating boilers.

§ 61.05–20 *Machinery guards.* Gears, couplings, flywheels, and all machinery capable of injuring personnel shall be provided with adequate covers or guards.

SUBPART 61.10—INITIAL AND PERIODIC VESSEL INSPECTION

§ 61.10–1 *Scope.* (a) Initial and periodic inspection and tests shall be made of the main and auxiliary machinery, boilers and equipment as prescribed in this part. The inspections and tests shall be such as to insure that the main and auxiliary machinery, boilers and their appurtenances, and equipment are in satisfactory operating condition and fit for the service for which they are intended.

§ 61.10–5 *Requirements for steam-propelled motorboats.* (a) The requirements covering design of the propelling engine, boiler, and the auxiliary machinery, and the inspection thereof on all motorboats which are more than 40 feet in length and which are propelled by machinery driven by steam shall be in accordance with the applicable provisions of this subchapter.

(b) If the engines, boilers, and auxiliary machinery are found to be in safe operating condition at the initial or annual inspection, the Officer in Charge, Marine Inspection, shall issue a letter to that effect, and such letter shall be posted on the vessel under glass.

SUBPART 61.15—TESTS AND INSPECTION OF MACHINERY AND EQUIPMENT

§ 61.15–1 *Special surveys for unclassed passenger vessels.* (a) Special periodical surveys for all unclassed passenger vessels shall be conducted in addition to or in conjunction with the annual inspection. Such special surveys shall be made at intervals of 4 years from date of build, except that for vessels operating exclusively in fresh water, the initial and subsequent surveys may be made at 5-year intervals.

(b) At each special survey an inspection shall be made as follows:

(1) Main and auxiliary steam engines shall be examined, including turbine blading and rotors, cylinders, pistons, valves, condensers, and such other parts as deemed necessary by the inspector shall be opened up for examination.

(2) Internal combustion engines shall be opened up and cylinders, cylinder heads, valves and valve gear, fuel pumps, scavenging pumps, superchargers, pistons, cross-heads, connecting rods, crank-shafts, clutch, reversing gear, air compressors and such other parts examined as may be deemed necessary by the inspector.

(3) Bilge and fire pumps, valves, strainers and the piping system shall be examined and tested under working conditions.

(4) Sea chests, cocks, valves and strainers shall be opened up for examination, also overboard discharges, ash chutes and all openings in the shell shall be examined, and renewals made as found necessary.

(5) Shafting (except the tail shaft), main and line shaft bearings, and thrust bearings shall be examined. (For tail shafts, see § 61.15–15.)

(6) Reduction gears shall be opened up and an examination made of shafts, bearings, and gear teeth.

(7) Where the propelling machinery is located amidships, the after bearing shall be rebushed when it has worn down to ¼ inch clearance for shafts of 9 inches or less in diameter, 5/16 inch clearance for shafts exceeding 9 inches, but not over 12 inches in diameter, and ⅜ inch clearance for shafts exceeding 12 inches diameter. Where the propelling machinery is located aft the maximum clearance shall be one grade (1/16 inch) less than the above.

(c) The special surveys shall in no way effect the thoroughness of the required annual inspection. However, parts of the machinery which have previously been examined within a twelve months period need not be reexamined if the machinery has been opened up.

(d) If the machinery or auxiliaries are found to be defective, repairs or replacements shall be effected as deemed necessary by the Officer in Charge, Marine Inspection.

§ 61.15–5 *Tests and inspection of steering gear.* (a) Steering gear shall be tested annually at the regular inspection period.

(b) All devices employed in the change-over from automatic to manual operation shall be examined and tested.

§ 61.15–10 *Trial-trip observance.* The operation of main and auxiliary engines, boilers, steering gear and auxiliaries shall be observed on the trial trip of each new vessel and all deficiencies which affect the safety of the vessel shall be corrected to the satisfaction of the Officer in Charge, Marine Inspection.

§ 61.15–15 *Tail shaft survey.* (a) Vessels operating in salt water having the tail shaft fitted with a continuous liner or where pressure lubrication is used shall have the tail shaft drawn at least once in every three years; in all other cases they shall be drawn every two years or whenever deemed necessary by the Officer in Charge, Marine Inspection. However, if the circumstances warrant it, the Coast Guard District Commander may extend this time to the next regular drydocking period but not to exceed 4 months: *Provided,* That when it is shown that a vessel has had a long period of lay-up, the Coast Guard District Commander may grant an extension equal to the time the vessel has been out of commission, but in no case shall the extension exceed one year.

(b) Vessels operating in salt water service where the propelling machinery is located amidships shall have the after bearing rebushed when it is worn down to ¼ inch clearance for shafts of 9 inches or less in diameter, 5/16 inch clearance for shafts exceeding 9 inches but not

exceeding 12 inches in diameter, and ⅜ inch clearance for shafts exceeding 12 inches diameter. Where the propelling machinery is located aft the maximum clearance shall be one grade (1/16 inch) less than the above clearances.

(c) Vessels operating in fresh water exclusively shall have the tail shaft drawn aft as far as possible and examined at least once in every 5 years. The after bearing shall be rebushed when it is worn down to 5/16 inch clearance for shafts of 9 inches or less in diameter, ⅜ inch clearance for shafts exceeding 9 inches, but not more than 12 inches, and ½ inch clearance where the shaft exceeds 12 inches in diameter.

(d) When the vessel is dry docked, examination shall be made of the propeller, stern bushing, sea connections, and fastenings if deemed necessary by the inspector.

SUBPART 61.20—TESTS AND INSPECTION OF BOILERS

§ 61.20–1 *Boilers under construction.* (a) When one or more boilers are under construction, manufacturers shall allow inspectors access to such boilers at such times as the inspectors shall deem necessary in order to determine by actual measurements that the boilers are being constructed in all respects in accordance with the approved design, and that the workmanship is good.

(b) Where boilers or pressure vessels are constructed in one inspection zone for installation on a vessel in another district, the Officer in Charge, Marine Inspection, in the former inspection zone shall, upon request of the Officer in Charge, Marine Inspection, in the latter inspection zone examine and report on such boilers or pressure vessels and ascertain that the proper materials are being used, and that the workmanship is good.

(c) For inspection of welded pressure vessels under construction, see § 61.25–3.

§ 61.20–5 *Preparation of boilers for inspection and test.* (a) It shall be the responsibility of the chief engineer to prepare the boilers for inspection. For internal inspection, manhole, and handhole plates, and washout plugs shall be removed as required by the inspector and the furnace and combustion chambers thoroughly cooled and cleaned. Portable obstructions shall be removed as necessary for proper access. In preparing the boilers for the hydrostatic test, they shall be filled with water at not less than 70° F. and not more than 160° F. for water tube boilers and not more than 100° F. for fire tube boilers. The safety valves shall be secured by means of gags or clamps.

§ 61.20–10 *New boilers.* (a) Each new boiler shall be hydrostatically tested after installation to 1½ times the maximum allowable pressure before the boilers are covered. All accessible parts of the boiler shall be examined while under test. After the test, the boiler shall be emptied, opened up and all interior surfaces shall be examined to ascertain that no defects have occurred due to the hydrostatic test.

(b) In addition to the hydrostatic tests prescribed in this section, automatically controlled packaged auxiliary boilers shall be subjected to the performance test specified in Subpart 162.026, Subchapter Q (Specifications) of this chapter.

(c) Upon completion of the hydrostatic test and the boiler examination prescribed in paragraph (a) of this section, and after the installation of the brick work and lagging, those boilers that are to be operated at a pressure equal to or in excess of 400 pounds per square inch gage, or at a steam temperature equal to or in excess of 700° F., may, at the request of the owner or builder, be given an additional test under steam in accordance with the following:

(1) The steam pressure applied to the boilers and to the main and auxiliary steam piping shall not exceed 1¼ times the maximum allowable pressure. Sufficient steam is to be bled from the superheater outlet, either by operating auxiliary machinery, or discharging to the atmosphere, so that service temperatures will not be exceeded. For this test the regular safety valve springs should be replaced by springs designed to operate at the test pressure. After the conclusion of this test the test springs are to be replaced with springs designed to operate at the maximum allowable pressure.

(2) An examination shall be made of all parts of the system during the test to determine there is no evidence of weakness.

§ 61.20–15 *Boilers in service.* (a) Power boilers, superheaters, economizers and low-pressure heating boilers shall be examined at least once every 12 months to determine that the complete unit is in a safe and satisfactory condition. Where hydrostatic tests are required, an inspection shall be made of all accessible parts while under pressure.

(b) Hydrostatic tests shall be applied to all boilers as provided in Table 61.20–15 (b) at the regular inspection period.

TABLE 61.20–15 (b)—HYDROSTATIC TESTS

Boiler	Passenger vessels	Cargo tank and miscellaneous vessels
Fire tube	Annual	Annual.
Water tube	do	Quadrennial.

(c) Fire tube boilers which cannot be entered or which cannot be satisfactorily examined internally, all boilers of lap seam construction and all boilers to which extensive repairs have been made or the strength of which the inspector has any reason to question, shall be subjected to a hydrostatic test of 1½ times the maximum allowable pressure. All other boilers shall be subjected to a hydrostatic test of 1¼ times the maximum allowable pressure.

(d) In applying hydrostatic pressure to boilers, arrangements shall be made to prevent main and auxiliary stop valves from being subjected at the same time to the hydrostatic pressure on one side and steam pressure on the other side.

(e) If the inspector has reason to believe that the boiler has deteriorated any appreciable extent under the bottom where it rests on saddles or foundations, he shall cause the boiler to be lifted to such position that it can be thoroughly examined, provided the examination cannot be made otherwise.

(f) The inspector may require any boiler to be drilled to determine the actual thickness at any time if doubt exists as to its safety. At the first annual inspection after a Scotch, Western River, or other fire tube or flue boiler has been installed for 10 years, and at such other times as the inspector shall deem necessary, such boilers shall be drilled at or near the waterline and bottom, and at such other places as the inspector considers necessary, for the purpose of gaging the shell to determine the extent of deterioration. If the thickness found by actual measurement is less than the original thickness, the maximum allowable pressure shall be recalculated using the thinnest portion of the shell plate as the thickness of the shell and shall not exceed the maximum pressure permitted by the application of boiler design formulas. For the purpose of such recalculations, the design formulas specified in this subchapter shall be used for boilers made or contracted for on or after July 1, 1935. The design formulas specified in Subchapter G (Marine Engineering Installations contracted for prior to July 1, 1935), of this chapter may be used for boilers made or contracted for prior to July 1, 1935, or alternatively, the design formulas set forth in this subchapter may be used.

§ 61.20–20 *Boiler mountings and attachments.* (a) All valves and other boiler mountings and attachments shall be opened up and examined by the inspector after each 4 years of service, and such valves, boiler mountings, and attachments shall be removed from the boilers after each 8 years of service for examination of the studs or bolts connecting them to the boiler. The Officer in Charge, Marine Inspection, may require the examinations prescribed by this section to be made at more frequent intervals, if in his opinion such action is necessary to be assured of the safety of the boiler.

(b) Water columns, gage glasses, and gage cocks shall be examined to determine that they are in satisfactory working order.

(c) Steam gages on boilers or main steam lines shall be examined and checked for accuracy.

(d) The inspector shall examine the fusible plugs.

§ 61.20–25 *Boilers of foreign-built vessels admitted to American registry.* (a) Where foreign-built vessels are admitted to American registry the Officer in Charge, Marine Inspection, shall endeavor to secure drawings from which the boilers were constructed and a record of the chemical and physical properties of the material entering into the construction of the boilers. Before a certificate of inspection of a vessel is issued by any Officer in Charge, Marine Inspection, the requirements of this section shall be met.

(b) The drawings if available shall be examined to determine the maximum allowable pressure in accordance with the regulations in this subchapter, and

the test reports of the material shall be carefully checked to determine whether the material used in the construction of the boilers is safe.

(c) The boiler or boilers shall be measured in order to obtain accurate data, which data shall be embodied in the report of the inspector making the examination. All plates shall be drilled and gaged by the inspector to determine the actual thickness, and upon the thickness thus obtained the maximum allowable pressure shall be based. The furnaces shall be trammed to ascertain if there is any distortion. The safety valves and mountings shall be thoroughly examined to determine if they are in good working condition and if their capacity is ample.

(d) Each section of the steam pipe shall be drilled and gaged, and, where bends occur in the piping, they shall be drilled in the outer wall of the bends to determine the thickness thereof.

(e) When the inspection is completed and steam is raised on the boilers, an accumulation test shall be conducted, where required, in accordance with the provisions of § 52.65–5 of this subchapter to establish the fact that the safety valves have ample relieving capacity.

(f) Where drawings of the boilers and test reports of the material entering into their construction cannot be obtained, the maximum allowable pressure shall be based on the actual thickness of material found and an assumed tensile strength not to exceed 60,000 p. s. i., together with the general condition of the boilers: *Provided*, That the maximum allowable pressure thus obtained shall not exceed in any case the maximum pressure allowed by the certificate issued by the government under whose flag the vessel formerly operated.

SUBPART 61.25—TESTS AND INSPECTIONS OF PRESSURE VESSELS

§ 61.25–1 *Scope.* For exemption of certain pressure vessels from shop inspection, see § 54.01–1 of this subchapter.

§ 61.25–3 *Welded pressure vessels under construction.* (a) The manufacturer shall submit class I welded pressure vessels for shop inspection at such stages of partial completion as may be requested by the inspector.

(b) The first inspection of class II welded pressure vessels shall be performed during the welding of the longitudinal joint. At this time the inspector shall check the material and fit-up of the work, and ascertain that only welders who have passed the required tests are employed.

(b) The first inspection of class II welded pressure vessels shall be made during the welding of the circumferential joints. At this time the inspector shall check any now material being used which may not have been examined at the time of the first inspection, also the fit-up of the vessel at this stage of fabrication, and in addition, observe the welding to ascertain that only welders who have passed the required tests are employed.

(d) For class III welded pressure vessels, one inspection shall be made during the welding of the longitudinal joint. If there is no longitudinal joint, the inspection shall be made during the welding of a circumferential joint. At this time the inspector shall check the material and fit-up of the work and see that only welders who have passed the required tests are employed.

§ 61.25–5 *New pressure vessels.* (a) Upon the completion of a new pressure vessel one of the following applicable hydrostatic tests shall be made in the presence of an inspector.

(1) Riveted construction: 1½ times the maximum allowable pressure. (See § 61.25–10.)

(2) Welded and brazed construction: 1½ times the maximum allowable pressure. (See § 61.25–15.)

(3) Cast construction: 2 times the maximum allowable pressure.

(b) Pressure vessels containing refrigerants shall be leak-tested with gas after installation to the design pressures specified in § 55.13–5 of this subchapter.

§ 61.25–10 *Hydrostatic test of riveted pressure vessels.* (a) Riveted pressure vessels shall be hydrostatically tested to not less than 1½ times the maximum allowable pressure for a sufficient time to permit an inspection of all joints and connections.

(b) The tightness of the rivets and the riveted joints shall be tested by tapping the heads with a rivet-testing hammer.

(c) Loose, cracked, and burned rivets shall be replaced.

(d) The inspector shall examine the butt straps and ends of shell plates forming the longitudinal joints to ascertain that they are formed to the proper curvature and that the butt straps are properly fitted at the girth joint intersections.

§ 61.25–15 *Hydrostatic test of welded and brazed pressure vessels.* (a) Arc- or gas-welded vessels which have been both stress-relieved and radiographed need not be subjected to the hammer test but shall be hydrostatically tested to not less than 1½ times the maximum allowable pressure for a sufficient time to permit an inspection of all joints and connections. Welded pressure vessels, 12 feet or less in diameter and/or 20 feet or less in vertical height, the welded joints of which are not stress-relieved and radiographed, and all brazed pressure vessels shall be subjected to a hydrostatic test pressure of at least 1¼ times but not more than 1½ times the maximum allowable pressure, and while subject to this pressure all welded and brazed joints shall be given a thorough hammer or impact test. This impact test shall consist of striking the plate at 6-inch intervals on both sides of the welded joint and for the full length of all joints. The weight of the hammer in pounds shall approximately equal the thickness of the shell in tenths of an inch, but not to exceed 10 pounds, and the plates shall be struck with a sharp swinging blow. The edges of the hammer shall be rounded so as to prevent defacing the plate. This hammer test shall be applied to vessels over 12 feet in diameter and/or 20 feet or more in vertical height while they are empty prior to the hydrostatic test.

(b) Following the hammer test, the vessels shall be hydrostatically tested to not less than 1½ times the maximum allowable pressure for a sufficient length of time to permit an inspection of all joints and connections.

(c) The maximum allowable pressure used in determining the hydrostatic tests shall be that for which a pressure vessel is suitable at normal atmospheric temperature based on the actual dimensions and material thicknesses of the vessel.

(d) Pinholes, cracks, or other defects shall be repaired only by chipping, machining, or burning out the defect and rewelding. For gas welding, the metal around the defects shall be preheated to a dull red for a distance of at least 4 inches all around. Any preheating means may be used, such as a flange fire, gas or oil burner, or a welding torch. The preheating shall be done slowly, so the heat will soak into the plate and expand it thoroughly. After welding, the vessel shall be reheated in the vicinity of each weld until the heat has equalized in the dull-red spot, and then slowly cooled. For arc welding, preheating or reheating is not required.

(e) Vessels requiring stress relieving shall be stress-relieved after any welding repairs have been made.

(f) After repairs have been made the vessel shall again be tested in the regular way, and if it passes the test, the inspector shall accept it. If it does not pass the test, the inspector can order supplementary repairs, or, if in his judgment the vessel is not suitable for service, he may permanently reject it.

§ 61.25–20 *Pressure vessels in service.* (a) Pressure vessels which are fitted with manholes or other inspection openings, so they can be satisfactorily examined internally, shall be opened biennially at the regular annual inspection and thoroughly examined internally and externally. Such pressure vessels are not required to be hydrostatically tested unless defects are found which in the inspector's opinion may impair the safety of the pressure vessel, in which case a hydrostatic test shall be applied at a pressure equal to 1¼ times the maximum allowable pressure.

(b) Pressure vessels, other than tubular heat exchangers and those used in refrigeration service, which cannot be examined internally, shall be tested hydrostatically to 1¼ times the maximum allowable pressure biennially at the regular annual inspection.

(c) Tubular heat exchangers and those used in refrigeration service shall be examined under operating conditions at the annual inspection.

(d) Unfired pressure vessels containing liquefied compressed gases or hazardous liquids shall be inspected and tested as required by the applicable regulations published in Subchapter D (Tank Vessels) and Subchapter N (Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

SUBPART 61.30—TESTS AND INSPECTION OF PIPING, VALVES AND FITTINGS

§ 61.30–1 *Scope.* In conducting hydrostatic tests on piping, the required test pressure shall be maintained for a sufficient length of time to permit an inspection to be made of all joints and connections, and the setting of the relief

valve or safety valve will be considered as establishing the maximum allowable pressure of the system.

§ 61.30–5 *Shop test.* (a) The manufacturer shall test all valves and fittings to a hydrostatic shell pressure as follows:

(1) For steam ratings; bronze, malleable iron, and cast iron: 2 times the primary pressure rating marked on the valve or fitting.

(2) For steam ratings; steel: The respective test pressures as prescribed in Tables 55.07–15 (e12) and 55.07–15 (e13) of this subchapter.

(3) For liquid or gas service not exceeding 150° F.; bronze or malleable iron: 1½ times the secondary pressure rating marked on the valve or fitting.

(b) Special valves, such as manifolds, scuppers, seacocks and appurtenances shall be tested to twice the design pressure stamped thereon.

§ 61.30–10 *Installation test.* (a) The following piping systems shall be hydrostatically tested in the presence of an inspector at a pressure of 1½ times the maximum allowable pressure:

(1) Class I steam, feed-water, and blow-off piping, except that where piping is attached to boilers by welding without practical means of blanking off for testing, the piping shall be subjected to the same hydrostatic pressure to which the boilers are tested.

(2) Fuel oil discharge piping between the pumps and the burners, but not less than 500 p. s. i.

(3) High-pressure piping for tank-cleaning operations.

(4) Inflammable or corrosive liquids and compressed gas cargo piping, but not less than 150 p. s. i.

(5) Hydraulic oil piping.

(6) Any class I piping not specifically listed in this paragraph.

(7) Cargo oil piping.

(8) Firemains, but not less than 150 p. s. i.

(9) Fuel oil transfer and filling piping.

(10) Compressed air piping.

(b) Refrigeration piping shall be leak-tested to the design pressures as specified in § 55.13–5 of this subchapter.

(c) Piping systems not specifically listed in this paragraph shall be tested under working conditions.

(d) Arc- or gas-welded pipe joints of class I piping which are not examined by radiography shall be given a hammer test as required by § 61.25–15.

§ 61.30–15 *Piping in service.* (a) Main steam piping shall be subjected to a hydrostatic test equal to 1¼ times the maximum allowable pressure at the same periods prescribed for boilers in § 61.20–15. The hydrostatic test shall be applied from the boiler drum to the throttle valve. If the covering of the piping is not removed, the test pressure shall be maintained on the piping for a period of ten minutes, and, if any evidence of moisture or leakage is detected, the covering shall be removed and the piping thoroughly examined.

(b) Steam piping subject to main boiler pressure and exceeding 3 inches in diameter, except as otherwise provided for in paragraph (a) of this section, shall be subjected to a hydrostatic test pressure of 1¼ times the maximum allowable pressure after each 4 years of service. If the covering of the piping is not removed, the test pressure shall be maintained on the piping for a period of ten minutes, and, if any evidence of moisture or leakage is detected, the covering shall be removed and the piping thoroughly examined.

(c) The setting of safety valves or relief valves on reduced pressure lines, evaporators, feedwater heaters, and other pressure vessels shall be checked by the inspector at each annual inspection.

§ 61.30–20 *Sea chests, sea valves and strainers.* (a) Sea chests, sea valves, sea strainers and bilge injection valves shall be opened up for examination at the time of drydocking if deemed necessary by an inspector.

SUBPART 61.35—PROOF HYDROSTATIC TESTS

§ 61.35–1 *Hydrostatic tests of boilers and appurtenances to determine pressure rating*—(a) *Scope.* (1) Where it is necessary to test a pressure vessel, or appurtenance, or any pressure part thereof, to determine a pressure rating in accordance with the provisions of § 52.01–70 of this subchapter the procedure specified in this subpart shall be adhered to as closely as practicable.

(2) This method of test is applicable only to materials having a definite proportional or elastic limit such as carbon and alloy steels. It is not applicable to materials with indefinite or indeterminate proportional limits such as cast iron and most nonferrous materials. The principle upon which the test is based assumes that the most highly stressed point in the pressure part will be subjected to a permanent set when the stress at this location reaches the proportional or elastic limit. Since the stress will be directly proportional to the hydrostatic pressure, the determination of the pressure which stresses the weakest point to the proportional limit will permit a calculation of the maximum allowable pressure that will result in a safe stress for the material from which the part is made at the maximum operating temperature.

(b) *Materials.* The structure shall be made from material conforming to the requirements of the appropriate subpart of Part 51 of this subchapter.

(c) *Workmanship.* The dimensions, thickness, and physical properties of the structure to be tested shall not vary materially from those actually used. If possible, the structure to be tested may be selected at random from a quantity of such intended for use.

(d) *Preparation for test.* (1) It is necessary to test only the weakest point of the structure but several points may be checked to make certain that the weakest one is included. The less definite the location of the weakest point, the more points shall be checked.

(2) The movement of the reference points may be measured with reference to a fixed surface, or two reference points may be located on opposite sides of a symmetrical structure and the total deformation between those two points measured.

(3) Indicating micrometer gages accurate to 0.001 inch are most suitable for measuring deformation of the structure at the reference points although any form of accurate micrometer may be used.

(4) A hand-test pump is satisfactory as a source of hydrostatic pressure. Either a test gage or a reliable gage which has been calibrated with a test gage shall be attached to the structure.

(5) The maximum hydrostatic pressure that shall be provided will vary from two or three times the expected maximum allowable pressure for carbon-steel structures.

(6) The location of the weakest point of the structure may be determined by applying a thin coating of plaster of paris or similar material, and noting where the surface coating starts to break off under hydrostatic test. The coating shall be allowed to dry before the test is started.

(e) *Hydrostatic tests.* (1) The first application of hydrostatic pressure shall be approximately the expected maximum allowable pressure, or the tests may be arranged with a view to making not less than 10 applications of pressure in approximately equal increments between the initial test pressure and the final test pressure.

(2) When each increment of pressure has been applied, the valve between the pump and the structure under test shall be closed and the pressure gage watched to see that the pressure is maintained and no leakage occurs. The total deformation at the reference points shall be measured and recorded and the hydrostatic pressure also recorded. The pressure shall then be released and each point checked for any permanent deformation which may be recorded. Only one application of each increment of pressure is necessary. The pressure shall be increased by substantially uniform increments, and readings taken until the elastic limit of the structure has obviously been exceeded.

(3) The pressure part shall not have been subjected to a pressure greater than twice the maximum allowable pressure prior to making the proof hydrostatic test.

§ 61.35–5 *Proportional limit method*—(a) *Physical characteristics of metal.* (1) The proportional limit of the material should be determined in accordance with A. S. T. M. Specification E8, Standard Method of Tension Testing of Metallic Materials. This test shall be made from a number of specimens cut from the part tested, in order to assure that the average proportional limit of the material in the part tested is used to calculate the allowable pressure.

(2) The specimens shall be cut from a location where the stress during the test has not exceeded the proportional limit, so that the specimens will be representative of the material as tested. The specimens shall not be cut with a flame torch.

(b) *Plotting curves.* In plotting curves, a single cross-section sheet may be used for each reference point of the structure. A scale of 1 inch=0.01 inch deformation, and a scale of at least 1

inch equals the approximate test pressure increments have been found satisfactory. Plot two curves for each reference point, one showing total deformation under pressure and one showing permanent deformation when the pressure is removed.

(c) *Determining proportional limit of pressure part.* In determining the proportional limit of pressure parts, the following procedure shall be employed:

(1) Locate the proportional limit on each curve of total deformation as the point at which the total deformation ceases to be proportional directly to the hydrostatic pressure. Draw a straight line that will pass through the average of the points that lie approximately in a straight line. The proportional limit will occur at the value of hydrostatic pressure where the average curve through the points deviates from the straight line.

(2) In pressure parts such as headers, where a series of similar weak points occur, the average hydrostatic pressure corresponding to the proportional limits of the similar points may be used.

(3) The proportional limit obtained from the curve of total deformation may be checked from the curve of permanent deformation by locating the point where the permanent deformation begins to increase regularly with further increases in pressure. Permanent deformations of a low order that occur prior to the point actually corresponding to the proportional limit of the structure, resulting from the equalization of stresses and irregularities in the material, may be disregarded.

(4) It should be made certain that the curves show the deformation of the structure and not slip or displacement of reference surfaces, gauges, or the structure.

(d) *Determining maximum allowable pressure.* (1) Having determined the hydrostatic pressure when the proportional limit of the weakest point of the vessel was reached, the corresponding maximum allowable pressure may be determined by formula (1):

$$P = \frac{HS}{E} \qquad (1)$$

where:

P = maximum allowable pressure, in p. s. i.
H = hydrostatic pressure at the proportional limit of the pressure part, in p. s. i.
S = maximum allowable stress, 80 percent of the values, as given in tables 52.05–10 (a) and 100 percent of the values given in Table 55.07–5 (a) of this subchapter.
E = average proportional limit of the material, in p. s. i.

(2) For carbon steel material, complying with the material specifications in Part 51 of this subchapter and with a minimum tensile strength not over 62,000 p. s. i., the proportional limit may be assumed to be two-fifths of the average tensile strength of the specified range. Where no range is specified, the average tensile strength may be assumed as 5,000 p. s. i. greater than the minimum. This alternate procedure will eliminate the necessity for cutting tensile specimens and determining the actual proportional limit above the normal value. The pressure part shall be normalized after forging or forming.

(e) *Retests.* A retest will be allowed on an additional similar vessel if errors or irregularties are obvious in the results.

SUBPART 61.40—MARKINGS

§ 61.40–1 *Boilers.* (a) Upon satisfactory completion of the tests and inspection of a new boiler the following data shall be stamped on the front head of fire-tube boilers and on the drum head of water-tube boilers:

Name of fabricator and serial number
---p. s. i.
Design pressure
---p. s. i.
Hydro test pressure
---p. s. i.
Steam test pressure

U. S. C. G. No.

C. G. Symbol

Inspector's initials

Month and year fabricated

(b) The inscription on the boiler and the boiler name plate, as required in paragraph (a) of this section, shall contain the following entry for steam tests: "Steam test _____ p. s. i.," which shall follow the notation for hydrostatic test.

(c) The data shall be legibly stamped and shall not be obliterated during the life of the boiler. In the event that the portion of the boiler upon which the data is stamped is to be insulated or otherwise covered, the data shall be transferred to a metal name plate which shall be attached to the boiler casing or the uptake. The name plate shall be maintained in a legible condition so that the data can be easily read.

§ 61.40–5 *Unfired pressure vessels.* (a) After an inspector has examined a new pressure vessel subject to inspection and has determined that the vessel has been constructed in accordance with the applicable parts of this subchapter, and the vessel has satisfactorily withstood the required tests, the following data shall be stamped thereon:

(Name and Address of Fabricator)
---p. s. i.
(Design Pressure)
---p. s. i.
(Shop Test Pressure)

(O. C. M. I. No., Inspector's Initials, and C. G. Symbol)

(Mfr. Serial No.)

(Month and Year)

(Riveted, Brz., Welded (Class))

SUBPART 61.45—OFFICIAL FORMS

§ 61.45–1 *Scope.* This subpart includes descriptions of the official forms required to be submitted to the Coast Guard by the regulations in this subchapter. Copies of the forms may be obtained upon request from the nearest Officer in Charge, Marine Inspection, or the Commandant (MMT), United States Coast Guard, Washington 25, D. C.

§ 61.45–5 *Form CG 2935; boiler data report; manufacturer's certification.* The manufacturer of each boiler to be used on vessels subject to inspection by the Coast Guard shall submit to the Officer in Charge, Marine Inspection, at or nearest the place where the manufacturer's plant is located, a data report in triplicate on form CG 2935 together with a certification that the data is correct and that the material and fabrication of this boiler comply with all the regulations applicable thereto.

§ 61.45–10 *Form CG 2936; unfired pressure vessel data report; manufacturer's certification.* The manufacturer of unfired pressure vessels to be used on vessels subject to inspection by the Coast Guard shall submit to the Officer in Charge, Marine Inspection, at or nearest the place where the manufacturer's plant is located, a data report in triplicate on form CG 2936 together with a certification that the data is correct and that the material and fabrication comply with all the regulations applicable thereto.

§ 61.45–15 *Form CG 935A; affidavit of manufacturer of class B material or appliances.* The manufacturer of either class B materials or appliances for use on vessels subject to inspection by the Coast Guard and to the regulations in this subchapter shall submit to the Commandant (MMT), United States Coast Guard, Washington 25, D. C., an affidavit on form CG 935A certifying that certain product(s) of his manufacture furnished directly or through agents or dealers for use on vessels subject to inspection by the Coast Guard will comply with all regulations applicable thereto.

§ 61.45–20 *Form CG 945; report of chief engineer on fusible plugs inserted in boiler.* The form CG 945 shall be used by the chief engineer to report the renewal of fusible plugs. The completed form CG 945 shall be sent to the Officer in Charge, Marine Inspection, who conducted district in which the last annual inspection. This report shall be rendered immediately after each annual inspection to cover fusible plugs renewed at the annual inspection and also whenever fusible plugs are renewed at other times. Under the heading "Remarks" shall be given the reason why such renewal was necessary.

PART 62—SPECIAL OPERATING REQUIREMENTS

Part 62 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 63—INSPECTION OF VESSELS

Part 63 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 64—DUTIES OF INSPECTORS

Part 64 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 65—STEAM YACHTS

Part 65 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter G—Marine Engineering Installations Contracted for Prior to July 1, 1935

The title for Subchapter G is changed from "General Rules and Regulations; Ocean and Coastwise" to "Marine Engineering Installations Contracted for Prior to July 1, 1935"; and Chapter I is amended by adding a new Part 66 to Subchapter G reading as follows:

PART 66—GENERAL

SUBPART 66.01—GENERAL PROVISIONS

Sec.
66.01–1 Authority.
66.01–5 Assignment of functions.
66.01–10 Purpose of regulations.
66.01–15 Application of regulations.

SUBPART 66.03—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

66.03–1 Commandant.
66.03–5 Coast Guard District Commander.
66.03–10 Officer in Charge, Marine Inspection.
66.03–15 Marine inspector or inspector.
66.03–20 Requirements.
66.03–25 Headquarters.

SUBPART 66.05—GENERAL MATERIAL REQUIREMENTS

66.05–1 Repairs or replacement parts.
66.05–5 General classification of materials.
66.05–10 Basic information requirements.
66.05–15 Inspection and testing of Class A material.
66.05–20 Chemical analyses.
66.05–25 Certification of Class B material.
66.05–30 Tension tests.
66.05–35 Test reports.
66.05–40 Retests.
66.05–45 Rejections.
66.05–50 Appeals.
66.05–55 Process of steel manufacture.
66.05–60 Stamping plates and specimens.
66.05–65 Stock plates.
66.05–70 Workmanship and finish.
66.05–75 Heat treatment.
66.05–80 Reclassification of materials.
66.05–85 Alternative materials.

SUBPART 66.10—BOILER PLATE

66.10–1 Inspection and marking.
66.10–5 Chemical properties, steel plates.
66.10–10 Physical properties, steel plates.
66.10–15 Physical properties, iron plates.
66.10–20 Tension and bend tests.

SUBPART 66.15—STEEL BARS FOR STAYS AND BRACES

66.15–1 Tests and inspection.
66.15–5 Physical properties.
66.15–10 Tension and bend tests.
66.15–15 Manufacturer's affidavit covering tested stays.

SUBPART 66.20—LAPWELDED BOILER TUBES

66.20–1 Process.
66.20–5 Tests.

SUBPART 66.25—SEAMLESS STEEL BOILER TUBES

66.25–1 Process.
66.25–5 Finish.
66.25–10 Heat treatment.
66.25–15 Tests.
66.25–20 Statement or certificate of manufacturer of boiler tubes.

SUBPART 66.30—WELDED STEEL AND IRON PIPE

66.30–1 Process.
66.30–5 Physical properties.
66.30–10 Tension tests.
66.30–15 Flattening tests.
66.30–20 Hydrostatic tests.
66.30–25 Finish.

SUBPART 66.35—SEAMLESS STEEL PIPES

66.35–1 Process.
66.35–5 Physical properties.
66.35–10 Flattening tests.
66.35–15 Tension tests.
66.35–20 Marking.
66.35–25 Finish.

AUTHORITY: §§ 66.01–1 to 66.35–25 issued under R. S. 4405, as amended, and 4462, as amended, 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4430, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–408, 411, 412, 435, 489, 366, 363, 367, 463a, 1333, 50 U. S. C. 1275.

SUBPART 66.01—GENERAL PROVISIONS

§ 66.01–1 *Authority.* (a) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375 and 416), as well as in other provisions of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) The regulations regarding marine engineering interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4430, 4433, 4434, 4453, and 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–408, 411, 412, 435, 489, 366, 363, 367, 463a, 1333, and 50 U. S. C. 1275).

§ 66.01–5 *Assignment of functions.* By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard, by Reorganization Plan No. 26 of 1950, effective July 31, 1950, the functions formerly vested in the Commandant, United States Coast Guard were transferred to the Secretary of the Treasury with certain specific exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 66.01–10 *Purpose of regulations.* The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for marine engineering in accordance with the intent of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various International Conventions for Safety of Life at Sea and other treaties which affect the merchant marine. The regulations are necessary to carry out the provisions of law affecting inspected vessels and such regulations have the force of law.

§ 66.01–15 *Application of regulations.* (a) The regulations in this subchapter apply only to installations contracted for or built prior to July 1, 1935, and contain specifications and requirements for materials, design, construction, installation and inspection of boilers, unfired pressure vessels, safety valves and appurtenances, including piping systems, upon the strength and efficiency of which safety of life is dependent.

(b) The regulations in Subchapter F (Marine Engineering) of this chapter, apply to installations contracted for or built on or after July 1, 1935.

(c) Where existing vessels are reboilered, the mountings and attachments, including feed and blow-off valves and fittings, shall be renewed in accordance with the regulations in Subchapter F (Marine Engineering) of this chapter in effect at the time such work is contracted for or built. The steam piping shall be gaged and examined by the Officer in Charge, Marine Inspection, and if found to be of the thickness required at the time the piping was installed it may be continued in use so long as the Officer in Charge, Marine Inspection, is of the opinion that the piping may be safely continued in use. Changes in specifications of articles of equipment shall not apply to such articles which have been passed as satisfactory until replacement shall become necessary.

SUBPART 66.03—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

§ 66.03–1 *Commandant.* The term "Commandant" means the Commandant of the Coast Guard.

§ 66.03–5 *Coast Guard District Commander.* The term "Coast Guard District Commander" means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within his district, which include the inspections, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 66.03–10 *Officer in Charge, Marine Inspection.* The term "Officer in Charge, Marine Inspection," means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who under the superintendence and direction of the Coast Guard District Commander is in charge of an inspection district for the performance of duties with respect to the inspection, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 66.03–15 *Marine inspector or inspector.* The terms "marine inspector" or "inspector" mean any person from the civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspections, enforcements, and the administration of Title 52, Revised Statutes, and acts amendatory thereto, and rules and regulations thereunder.

§ 66.03–20 *Requirements.* The term "requirements" refers to process of manufacture, characteristic, physical and chemical properties, tests, workmanship, and finish of materials.

§ 66.03–25 *Headquarters.* The term "headquarters" means the Office of the Commandant, United States Coast Guard, Washington 25, D. C.

SUBPART 66.05—GENERAL MATERIAL REQUIREMENTS

§ 66.05–1 *Repair or replacement parts.* (a) Plates and steel bars subject to tensile stress used in the repair or replacement of pressure parts of boilers shall be tested, inspected, and stamped by an inspector in accordance with the requirements of Title 52 of the Revised Statutes of the United States, for Class A material, and shall conform to the applicable requirements of Part 51 of Subchapter F (Marine Engineering) of this chapter.

(b) Material used for pressure parts in the repair of pressure vessels other than boilers and in the repair or replacement of boiler tubes, piping, valves and fittings may be of Class B certified material conforming to the applicable requirements of Part 51 of Subchapter F (Marine Engineering) of this chapter.

§ 66.05–5 *General classification of materials*—(a) *General.* The materials to be used in the construction and for the repair of boilers and unfired pressure vessels, piping, valves, fittings, and appurtenances shall be of three general classes of which Classes A and B shall be used for pressure parts and Class C may be used for other parts as specified.

(b) *Class A.* Tested materials manufactured under the supervision of the Coast Guard, test of which shall be witnessed by an inspector.

(c) *Class B.* Certified materials tested by the manufacturers, and certified by them as conforming to the requirements.

(d) *Class C.* Materials for nonpressure parts of boilers or unfired pressure vessels such as casing for water-tube boilers, uptakes, furnace fronts, and operating equipment shall be of good commercial quality. No detail requirements are herein specified for material in this class. Class C materials shall be accepted by inspectors without requiring tests or certification by manufacturers.

§ 66.05–10 *Basic information requirements.* (a) When ordering Class A material for the repair of boilers or unfired pressure vessels installed on vessels subject to the inspection of the Coast Guard, the manufacturer of the material shall, as far as practicable, furnish the following information to the Officer in Charge, Marine Inspection, at or nearest the place where the boiler or unfired pressure vessel is to be repaired.

(1) Name and location of manufacturer's works.

(2) Type of boiler or unfired pressure vessel.

(3) Manufacturer's slab or plate number.

(4) Design pressure and temperature.

(5) Vessel's name.

§ 66.05–15 *Inspection and testing of Class A material.* Inspectors shall have free entry at all times to those parts of the works where material subject to the regulations in this part is being manufactured. The manufacturer shall afford inspectors all reasonable facilities to satisfy them that the material is being manufactured in accordance with the requirements of the Commandant. Unless otherwise authorized, tests and inspection shall be made at the place of manufacture prior to shipment and shall be so conducted as not to interfere unnecessarily with the operation of the works. Inspectors shall assure themselves that test specimens are marked for positive identification with the materials which they represent. Unless otherwise specified, tests shall be made at ordinary temperature.

§ 66.05–20 *Chemical analyses.* (a) A ladle analysis of each melt of Class A or B materials as specified by Part 51 of Subchapter F (Marine Engineering) of this chapter, shall be made by the manufacturer and a certified report thereof shall be furnished by him to the inspector upon request. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall conform to the specified requirements.

(b) A check analysis may be made at the discretion of the Commandant from test specimens representing material for which chemical composition is specified in any section of this part, in either Class A or B. The chemical composition thus determined shall conform to the requirements.

§66.05–25 *Certification of class B material.* (a) Certification of chemical analyses and physical tests of materials of Class B shall be an affidavit by the manufacturer certifying that all materials of this class supplied by him for marine service do, or will conform to all the requirments in Subchapter F (Marine Engineering) of this chapter applicable thereto.

(b) Materials in this class are not required to be tested in the presence of an inspector, but whenever deemed necessary by the Commandant he may detail an inspector to witness such tests and satisfy himself that the requirements of the specification for Class B materials are met.

§ 66.05–30 *Tension tests.* All tension tests shall be made on standard calibrated machines. The yield point in tension tests shall be determined by the drop of the beam or the halt in the gage of the testing machine. Except where otherwise specified in Part 51 of Subchapter F (Marine Engineering) of this chapter, the speed of the crosshead of the machine shall not exceed $\frac{1}{16}$ inch per minute per inch of gage length up to the yield point, nor shall it exceed $\frac{1}{2}$ inch per minute per inch of gage length beyond the yield point. Any convenient speed of the crosshead may be used from the start of loading the test specimen until a value estimated as one-half of the yield point is reached. In determining the yield strength by use of an extensometer, the crosshead speed shall not exceed 0.025 inch per minute per inch of gage length. In the event the machine is stopped in taking readings, the speed may be exceeded in the take up only. The ends of all test specimens shall be of form to fit the holders of the testing machine in such a way that the load will be axial.

§ 66.05–35 *Test reports.* Inspectors shall report the results of official tests on form CG 934. Duplicate copies thereof shall be forwarded through the Coast Guard District Commander in the district where the material was manufactured to the Coast Guard District Commander in the district where the material is to be fabricated.

§ 66.05–40 *Retests.* When the result of any of the physical tests specified for any of the materials does not conform to the requirements, two additional specimens may, at the request of the manufacturer be taken from the same lot and tested in the manner specified, but in such case, both of the specimens shall conform to the requirements. In the case of tension tests, this retest shall be allowed if the percentage of elongation obtained is less than required, or if any part of the fracture is outside of the middle third of the gauge length. If any test specimen develops flaws, it shall be discarded and another specimen from the same lot substituted.

§ 66.05–45 *Rejections.* Failure of the tests (or retests) specified in the regulations in this subchapter for each particular material shall be cause for rejection. Unless otherwise required, any rejection shall be reported by the inspector within 5 working days from the receipt of the test specimen. Acceptance of material on results of tests at the place of manufacture shall not prejudice the right to reject any of such material in which injurious defects are subsequently discovered. The manufacturer shall be promptly notified of such subsequent rejections, and the records shall be corrected.

§ 66.05–50 *Appeals.* In case of dissatisfaction with the results of any test, the manufacturer may appeal to the Coast Guard District Commander from the decision of the Officer in Charge, Marine Inspection, within 30 days. Should the Coast Guard District Commander sustain the Officer in Charge, Marine Inspection, the manufacturer may appeal to the Commandant within 30 days. Tested specimens which represent rejected material shall be retained for at least 30 days. The decision of the Commandant shall be final.

§ 66.05–55 *Process of steel manufacture.* Unless otherwise officially authorized by the Commandant, all wrought steel to be used in the repair of boilers or unfired pressure vessels shall be manufactured by the open-hearth, electric furnace, or crucible process.

§ 66.05–60 *Stamping plates and specimens.* (a) Class A plates used for repairs to boilers shall be stamped by the manufacturer, before they are tested, with his name or trademark, the word "Marine", the letter indicating the grade of the steel, and the minimum tensile strength of the plate per square inch of

cross-sectional area expressed in thousands. Inspectors shall permit cutting a plate into two or more parts before testing, but each part shall be stamped or match-marked for identification before cutting. All plates accepted by the inspector as conforming to the requirements shall be stamped by him near the manufacturer's stamp with the official stamp of the Coast Guard, the initials of his name, and the serial number. All test specimens shall be ring-stamped or match-marked for identification before being detached. Plates shall be stamped lengthwise in two places on one long side about 18 inches from the edges at the corners. Each butt strap shall be stamped lengthwise of the plate about the middle of the strap.

(b) The impression of the official stamp of the Coast Guard for stamping plates and specimens shall be as shown in Figure 66.05–60.

FIGURE 66.05–60—Official stamp.

§ 66.05–65 *Stock plates.* Plates may be ordered to be carried in stock ashore or on shipboard for repairs to boilers and unfired pressure vessels. Such plates shall be inspected and tested at the place of manufacture and stamped for identification as stock plates. A test report for such plates shall be furnished to the Coast Guard District Commander of the district where the purchaser is located, with a copy to the purchaser. The Coast Guard District Commander shall furnish a copy thereof to the Officer in Charge, Marine Inspection, where the material is kept in stock, and if the material is to be used by persons other than the original purchaser, they shall also be furnished with a copy of such report, for submittal by them to the Officer in Charge, Marine Inspection, where the repairs are actually to be made before the material may be used. Vessels carrying such stock plates shall obtain and carry identification and test records of each plate. Where such plates are cut into pieces for repairs, the Officer in Charge, Marine Inspection, shall, upon request, stamp each piece so detached for identification with the original plate and a record of such stamping shall be made.

§ 66.05–70 *Workmanship and finish.* All materials within the scope of the regulations in this subchapter shall be free from injurious defects and shall have a workmanlike finish.

§ 66.05–75 *Heat treatment.* Some of the materials specified in this part require heat treatment. This may consist of annealing, or of normalizing, or of normalizing followed by annealing, or of normalizing followed by a draw back to a temperature below the critical range. Annealing shall consist of allowing material to cool after forging or rolling to a temperature below the critical range, then reheating it to proper temperature to refine the grain and allowing it to cool in the furnace. Normalizing shall consist of allowing material to cool after forging or rolling to a temperature below the critical range, then reheating it to proper temperature to refine the grain and allowing it to cool in still air.

§ 66.05–80 *Reclassification of materials.* When more than one grade is specified for any material or purpose and tests of a material of a superior grade fail to meet the requirements, such material may be reclassified and accepted as a specified lower grade if it fulfills the specified requirements for the latter. In such cases, the material shall be restamped or re-marked as required for proper identification, and revised records shall be made to cover it.

§ 66.05–85 *Alternative materials.* If, in the development of industrial arts, other suitable or improved materials differing from those specified in this part are developed, their use will be given consideration, upon formal application to the Commandant with full information as to the characteristics of the material, and such scientific data and facts as may be necessary to establish the suitability and safety of the material for the use proposed. The material requirements in this subchapter are minimum requirements and are not intended to bar better materials.

SUBPART 66.10—BOILER PLATE

§ 66.10–1 *Inspection and marking.* (a) Every iron or steel plate intended for the construction of boilers to be used on steam vessels shall be stamped by the manufacturer in the following manner, at two diagonal corners, at a distance of about 18 inches from the edges.

(b) Plates to be used in the construction of externally fired boilers, the thickness of which shall not exceed one-half inch for steamers navigated under the provisions of Title 52, Revised Statutes, sections 4399–4500, which will be subject to tensile strain in said boilers, shall be Class A material tested and inspected by an inspector, and such plates shall not be stamped until they have been tested by the inspector, and each of such plates shall then be stamped by the manufacturer in the presence of the inspector with the name of the manufacturer, the place where manufactured, and the minimum number of thousand pounds tensile stress it will bear to the sectional square inch as has been determined by the test.

(c) Plates to be used in the construction of boilers other than the externally fired boilers as described in paragraphs (a) and (b) of this section, for steamers navigated under provisions of Title 52, Revised Statutes, sections 4399–4500, as amended (46 U. S. C. 361–498), which shall be subject to tensile strain in said boilers shall be a material tested and inspected by an inspector and such plates shall be stamped by the manufacturer before same are tested with the name of the manufacturer, the place where manufactured, and the minimum number of pounds the plate will bear to the sectional square inch, expressed in thousands.

(d) Inspectors testing iron or steel plate at the mills where same is manufactured shall allow the mills to shear any plate into butt straps or heads before the coupon from the plate is tested, and they shall accept the statement of the manufacturer that the coupon presented to the inspector for testing was taken from the plate from which the butt straps or heads were cut, and if the coupon meets all the requirements of this subpart the inspector shall stamp, in one place where it is most likely to be left legible after working into the boiler, all heads and butt straps cut from the plate.

(e) All plates which conform to the physical, chemical, and other requirements prescribed in this subchapter shall be stamped by the inspector near the manufacturer's stamp with the official stamp of the Coast Guard, and with the initials of his name and a serial number.

§ 66.10–5 *Chemical properties, steel plates.* (a) Steel plates shall be made by open-hearth process, except that steel for plates to be used in the manufacture of boiler tubes may be made by the Bessemer process.

(b) Open-hearth steel shall contain not more than 0.04 percent of phosphorus nor more than 0.05 percent of sulphur.

(c) The manufacturer shall furnish the inspector with each order tested, a certificate stating the process by which the steel was manufactured and a copy of the analysis of each melt. The analysis may, if deemed expedient by the Commandant, be verified at the expense of the manufacturer.

§ 66.10–10 *Physical properties, steel plates.* (a) All steel plates tested shall show an elongation of at least 20 percent measured in a gage length of 8 inches.

§ 66.10–15 *Physical properties, iron plates.* (a) The tenstile strength shall be not less than 45,000 pounds per square inch. The elongation shall be not less than 15 percent. The reduction of area shall be not less than 15 percent for 45,000 p. s. i. tensile strength, and for each increase of 1,000 p. s. i. tensile strength up to 55,000 p. s. i., an addition of 1 shall be made to the required percentage of reduction of area. The bend test specimen shall bend cold through 90 degrees around a curve the radius of which is not greater than one and one-half times the thickness of the specimen.

§ 66.10–20 *Tension and bend tests.* (a) All tension test specimens shall be milled to the form as shown in Figure 66.10–20 (a), with the following dimensions: Length at least 16 inches, ends from 1½ to 3½ inches wide by about 3 inches in length, and parallel section at center 1 to 1½ inches wide by 9 inches in length. The percentage of elongation shall be measured in a gage length of 8 inches.

(b) Where specimens are to be tested on the testing machines of the Coast Guard, they shall be 1 inch wide at parallel section in center, and shall not exceed 2 inches in width on the ends.

(c) All bend test specimens shall be at least 12 inches in length and from 1 to 3½ inches in width, and the full thickness as rolled. The edges may be planed. The corners shall not be rounded, but the sharpness may be removed with a fine file. After bending, the specimens shall show no cracks or flaws on the outside of the bent portion.

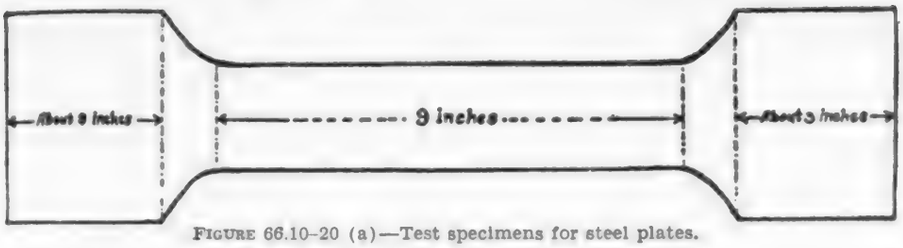


FIGURE 66.10-20 (a)—Test specimens for steel plates.

(d) Two tension tests and one cold-bend test shall be made from each plate as first rolled from a billet, slab, or ingot, the tensile test specimens to be taken from two diagonal corners of the plate, and a cold-bend specimen to be taken transversely from the middle of the top of the plate.

(e) The bend test specimen shall bend cold 180 degrees around a pin without showing any sign of cracking or other injurious defects on the outside of the bent portion, as follows: For plates under 1 inch in thickness the diameter of the pin shall be equal to one and one-half times the thickness of the plate; for plates 1 inch and over, up to and including 1½ inches in thickness, the diameter of the pin shall be equal to three times the thickness of the plate, and for all plates over 1½ inches in thickness the diameter of the pin shall be equal to four times the thickness of the plate.

(f) The finished material shall be free from all injurious defects, and shall have a good and workmanlike finish.

(g) All measurements of test specimens and material shall be made by any standard American gage, and record of tests shall be submitted on Form CG 934.

SUBPART 66.15—STEEL BARS FOR STAYS AND BRACES

§ 66.15-1 *Tests and inspection.* All steel bars to be used as stays or braces in marine boilers shall be of Class A tested material.

§ 66.15-5 *Physical properties.* The minimum tensile strength shall be not less than 58,000 pounds per square inch. The elongation shall be not less than 28 percent in 2 inches or 25 percent in 8 inches.

§ 66.15-10 *Tension- and bend-tests.* (a) Two tension-test pieces and two bend-test pieces shall be taken from each heat. The full-size bars within the capacity of the testing machine may be used for tensile tests. Where the full size of the bar is too large for the capacity of the testing machine, the bar may be reduced in size to meet such capacity. To facilitate and insure accurate tests, all bars for tensile and bending tests may be reduced in size.

(b) The minimum tensile strength of each piece shall be not less than 58,000 pounds per square inch of section and each test piece that has been reduced in size shall show an elongation of at least 28 percent in 2 inches. Where the full size of the bar has been used for testing, the test pieces shall show an elongation of at least 25 percent in 8 inches. When the tensile strength of the test piece is more than 63,000 pounds, per square inch of section, each test piece that has been reduced in size shall show an elongation of at least 26 percent in 2 inches. Where the full size of the bar has been used for testing, each test piece shall show an elongation of at least 22 percent in 8 inches.

(c) The pieces for the bend test shall be bent cold to a curve, the inner radius of which is equal to one and one-half times the diameter of the bar without flaws or cracks.

(d) Should any such test bar fail in either the tensile or bending test, no bars from such heat shall be allowed to be used in the construction of any marine boiler. Where a heat of steel bars has been passed by an inspector, separate lots of bars from such heat may be furnished to different boiler manufacturers upon a certificate from the mill that the bars were made from such accepted heat.

§ 66.15-15 *Manufacturer's affidavit covering tested stays.* Boiler manufacturers desiring to use tested stays or braces shall be required to furnish the inspectors with the following form of affidavit, duly filled in:

(Form CG 937)

STATE OF _____
County of _____
I hereby certify that I am the _____
_____ of the
(State "owner" or name position)
steam boiler works named _____
_____, situated at _____,
in the State of _____, and that the lot or lots of steel bars from which the test bars were taken and tested by the inspector on the _____ day of _____, 19____, and allowed for use in the steam boiler to be constructed for the steamer _____, and to be allowed a strain not to exceed _____ pounds per square inch of section as a working steam pressure, will be used in the construction of the boiler ____ for the steamer _____, and no material for any braces, stays, or stay bolts required to be made of tested material and to carry a strain equal to _____ pounds per square inch of section will be used as braces, stays, or stay bolts in the construction of the boiler ____ for the said steamer tested by the inspector and approved by him in accordance with the requirements of law.

(Signature) _____
Subscribed and _____ to before
(Sworn or affirmed)
me this _____ day of _____, 19____.
[SEAL] (Signature) _____
Notary Public.

SUBPART 66.20—LAPWELDED BOILER TUBES

§ 66.20-1 *Process.* (a) All lapwelded boiler tubes up to and including 4 inches in diameter shall be made of charcoal iron, or mild steel made by any process.

(b) All lapwelded boiler tubes over 4 inches in diameter, up to and including 30 inches in diameter, shall be made of wrought iron or mild steel, made by any process.

(c) Tubes shall be free from defective welds, cracks, blisters, scale, pits, and sand marks.

§ 66.20-5 *Tests.* (a) The following tests shall be made on lapwelded boiler tubes up to and including 4 inches in diameter:

(1) A test piece 2 inches in length cut from a tube shall stand being flattened by hammering until the sides are brought parallel and separated by a distance not greater than one-third the outside diameter of the tube, without showing cracks or flaws, the weld being 45 degrees from the bend.

(2) A second tube shall have a flange turned over at right angles to the body of the tube and shall have a width equal to ⅜ inch. Tubes less than 3 inches in diameter shall only be required to have a flange turned equal to one-eighth of the diameter of the tube. This test shall not be applied to threaded stay tubes.

(3) All the work shall be done cold.

(4) Each tube shall stand an internal hydrostatic pressure of 1,000 pounds per square inch and be struck near both ends while under pressure with a 2-pound hammer or its equivalent without showing signs of weakness or defects.

(5) All steel tubes, except those made of open-hearth steel, shall have the ends properly annealed by the manufacturer before shipment.

(6) All tubes shall stand expanding, flanging over on the tube plate, and beading without flaws, cracks, or opening at the weld, except threaded stay tubes.

(b) The following tests shall be made on lapwelded boiler tubes over 4 inches in diameter, up to and including 30 inches in diameter:

(1) A test piece, 2 inches in length, cut from a tube, shall stand being flattened by hammering until the sides are brought parallel and separated by a distance not greater than one-third the outside diameter of the tube, without showing cracks or flaws, with the weld being 45 degrees from the bend.

(2) Each tube shall stand an internal hydrostatic pressure of 500 pounds per square inch and shall be struck near both ends while under pressure with a 2-pound hammer or its equivalent without showing signs of weakness or defects.

(3) All steel tubes except those made of open-hearth steel shall have ends properly annealed by the manufacturer before shipment.

(4) All tubes shall stand drilling, riveting, and calking, and work necessary to install them into the tube head without showing any weakness or defects.

SUBPART 66.25—SEAMLESS STEEL BOILER TUBES

§ 66.25-1 *Process.* The steel shall be made by the open-hearth process.

§ 66.25-5 *Finish.* Tubes shall be free from all surface defects. The defects to be particularly avoided in seamless tubes are tears, snakes, checks, slivers, scratches, laps, pits, rings, and sinks.

§ 66.25-10 *Heat treatment.* All seamless steel cold-drawn tubes shall be annealed as a final process. One or more tubes shall be selected at random from

each charge of annealing furnace, and coupons cut from same for testing.

§ 66.25–15 *Tests.* (a) A piece 3 inches long cut from the first tube shall stand being flattened cold by hammering until the sides are brought parallel and separated by a distance not greater than one-third the outside diameter of the tube, without showing cracks or flaws.

(b) A flange shall be turned cold all around the end of the tube to a width equal to ⅜ inch beyond the outside body of the tube. Tubes less than 3 inches in diameter shall only be required to have a flange turned equal to one-eighth of the diameter of the tube. This test shall not be applied to threaded stay tubes.

(c) Where hot-finished tubes are furnished, the tubes shall pass the same manipulating tests as cold-drawn tubes and shall be subject to the same conditions as to gage, but do not have to be annealed.

(d) Each tube shall be subject to an internal hydrostatic pressure of 1,000 pounds per square inch without showing signs of weakness or defects.

(e) All tubes, except threaded stay tubes, shall stand expanding, flanging over on the tube plate, and beading without flaw or crack.

(f) All tubes shall be carefully gaged and shall not be less than the specified thickness.

§ 66.25–20 *Statement or certificate of manufacturer of boiler tubes.* When the manufacturers of boiler tubes file with the Commandant a certificate duly sworn to that all tubes manufactured by them will stand the tests and meet all the requirements of this part, they shall be accepted by inspectors of the Coast Guard and no other affidavit will be required.

SUBPART 66.30—WELDED STEEL AND IRON PIPE

§ 66.30–1 *Process.* The pipe material shall be made by the open-hearth or the bessemer process. Welded pipe shall be made by the hammer-weld process.

§ 66.30–5 *Physical properties*—(a) *Bessemer steel pipe.* Tensile strength, minimum, 50,000 p. s. i. Elongation in 8 inches, minimum, 20 percent.

(b) *Open-hearth steel pipe.* Tensile strength, minimum, 45,000 p. s. i. Yield point, minimum, 25,000 p. s. i. Elongation in 8 inches, minimum, 20 percent.

(c) *Wrought-iron pipe.* Tensile strength, minimum, 40,000 p. s. i. Yield point, minimum, 24,000 p. s. i. Elongation in 8 inches, minimum, 12 percent.

§ 66.30–10 *Tension tests.* (a) Tension tests are not required for pipes up to and including 3½ inches in diameter.

(b) For all diameters exceeding 3½ inches, tension tests shall be made from every 50 pieces furnished, or fraction thereof, and shall show the following results:

(1) *For bessemer steel.* Tensile strength, not less than 50,000 pounds per square inch. Elongation in 8-inch specimen, not less than 20 percent.

(2) *For open-hearth steel.* Tensile strength, not less than 45,000 pounds per square inch. Elongation in 8-inch specimen, not less than 20 percent.

(3) *For iron.* Tensile strength, 40,000 to 48,000 pounds per square inch. Elastic limit, 22,000 to 30,000 pounds per square inch. Elongation in 8-inch specimen, not less than 12 percent.

§ 66.30–15 *Flattening tests.* (a) Flattening tests are not required for pipe up to and including 3½ inches in diameter.

(b) For all diameters greater than 3½ inches inside, flattening tests shall be made as follows:

(1) *Steel.* A test piece 2 inches in length cut from a pipe shall stand being flattened by hammering until the sides are brought parallel with the curve on the inside at the ends not greater than one-third the outside diameter of the pipe without showing cracks or flaws, the weld being 45 degrees from the curve.

(2) *Iron pipe.* A test ring three times the thickness in length cut circumferentially from lapwelded wrought-iron pipe shall be crushed down to an inner diameter of one-third the outside diameter of the pipe. Wrought-iron pipe will not stand this test without fracture, but no lapwelded wrought-iron pipe shall be accepted where the break is short or crystalline or shows evidence of defective material or bad welding, and in every case the fiber of the iron shall be shown.

§ 66.30–20 *Hydrostatic tests.* (a) Pipes ⅛ inch inside diameter up to and including 3½ inches inside diameter shall be tested before shipment to 600 pounds per square inch hydrostatic pressure.

(b) All pipe above 3½-inch diameter shall be tested before shipment to not less than 500 pounds per square inch hydrostatic pressure.

§ 66.30–25 *Finish.* (a) The pipe shall be smooth, straight, and free from defects.

SUBPART 66.35—SEAMLESS STEEL PIPES

§ 66.35–1 *Process.* (a) The steel shall be made by the open hearth process.

§ 66.35–5 *Physical properties.* (a) Tensile strength, minimum, 48,000 pounds per square inch. Yield point, minimum, 26,500 pounds per square inch. Elongation in 2 inches, minimum, 40 percent.

§ 66.35–10 *Flattening test.* (a) A test piece 2 inches in length cut from a pipe, shall stand being flattened by hammering until the sides are brought parallel with the curve on the inside at the ends not greater than one-third the outside diameter of the pipe without showing cracks or flaws.

§ 66.35–15 *Tension tests.* (a) Tension tests shall be made from every 50 pieces furnished, or fraction thereof, and shall show the following results:

(1) Tensile strength, not less than 48,000 pounds per square inch.

(2) Elongation in 8-inch specimen, not less than 12 percent.

§ 66.35–20 *Marking.* (a) The name or brand of the manufacturer shall be legibly rolled in raised characters or stamped on the outer surface of each pipe.

§ 66.35–25 *Finish.* (a) Pipe shall be free, inside and outside, from all surface defects that would materially weaken it or form starting points of corrision. The defects to be especially avoided are snakes, checks, slivers, laps, pits, etc. Pipe shall be smooth and straight.

PART 67—CONSTRUCTION

Chapter I is amended by adding a new Part 67 to Subchapter G, reading as follows:

SUBPART 67.01—PROCEDURE AND GENERAL REQUIREMENTS

Sec.
67.01–1 Definitions.
67.01–5 Drawings.
67.01–10 Computations.
67.01–15 Appeals.
67.01–20 Materials and workmanship.
67.01–25 Alternative materials or methods of repair.
67.01–30 Repairs, replacements, or alterations.
67.01–35 Boilers built since February 28, 1872.
67.01–40 Inspectors' decisions.

SUBPART 67.05—CYLINDRICAL SHELLS

67.05–1 Definitions.
67.05–5 Materials.
67.05–10 Computations.

SUBPART 67.10—SHELL JOINTS

67.10–1 Approved types of joints.
67.10–5 Workmanship.
67.10–10 Riveted joints.
67.10–15 Butt straps.
67.10–20 Welded joints.

SUBPART 67.15—HEADS

67.15–1 Definitions.
67.15–5 Materials and workmanship.
67.15–10 Computations.

SUBPART 67.20—OPENINGS AND REINFORCEMENTS

67.20–1 Material.
67.20–5 Manhole openings.
67.20–10 Reinforced openings.

SUBPART 67.25—STAYS AND STAYED SURFACES

67.25–1 Definitions.
67.25–5 Materials and workmanship.
67.25–10 Stays.
67.25–15 Stayed surfaces.

SUBPART 67.30—COMBUSTION CHAMBERS AND TUBE SHEETS OF FIRE-TUBE BOILERS

67.30–1 Definitions.
67.30–5 Materials.
67.30–10 Computations.

SUBPART 67.35—FURNACES AND FLUES

67.35–1 Definitions.
67.35–5 Materials.
67.35–10 Computations.
67.35–15 Detail requirements.

SUBPART 67.40—BOILER AND SUPERHEATER TUBES

67.40–1 Definitions.
67.40–5 Materials and workmanship.
67.40–10 Computations.
67.40–15 Safe-ending.

SUBPART 67.45—SAFETY VALVES

67.45–1 Definitions.
67.45–5 General requirements.
67.45–10 Detail requirements.
67.45–13 Lever safety valves.
67.45–15 Spring-loaded safety valves.

SUBPART 67.50—BOILER MOUNTINGS AND ATTACHMENTS

67.50–1 Definitions.
67.50–5 Detail requirements.

Sec.
67.50–10 Superheaters.
67.50–15 Feed connections.
67.50–20 Fusible plugs.
67.50–25 Gage cocks and water glass.
67.50–30 Steam gages.

SUBPART 67.55—EVAPORATORS, FEED-WATER HEATERS, SEPARATORS, AND STEAM TRAPS MADE OF CAST IRON AND SUBJECT TO BOILER PRESSURE

67.55–1 Computations.
67.55–5 Evaporators.

AUTHORITY: §§ 67.01–1 to 67.55–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4430, 4433, 4434, 4453, and 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–408, 411, 412, 435, 489, 366, 363, 367, 463a, 1333, 50 U. S. C. 1275.

SUBPART 67.01—PROCEDURE AND GENERAL REQUIREMENTS

§ 67.01–1 *Definitions*—(a) *Main boiler.* A main boiler is a steam boiler used for generating steam for propulsion purposes on shipboard.

(b) *Auxiliary boiler.* An auxiliary boiler is a steam boiler used for all purposes on shipboard for which steam may be required other than propulsion.

(c) *Donkey boiler.* A donkey boiler is a steam boiler installed on a vessel for occasional use for any purpose for which steam is required other than propulsion.

(d) *Pressure vessel.* A pressure vessel is an unfired vessel containing gases, vapors, or liquids under pressure. (See Part 54 of Subchapter F (Marine Engineering) of this chapter.)

(e) *Water-tube boiler.* A water-tube boiler is a steam boiler in which the boiler tubes contain water and steam, the heat being applied to the outside surface of the tubes and is composed generally of drums, headers, and tubes.

(f) *Internally-fired fire-tube boiler.* (Scotch) An internally-fired fire-tube boiler is a steam boiler containing furnaces, one or more combustion chambers and tubes or flues which are surrounded by water and through which the products of combustion pass from the furnace to the uptake. In such boilers no part of the shell is in contact with the fire or products of combustion.

(g) *Externally-fired fire-tube or flue boilers.* (Horizontal return tubular) An externally fired and fire-tube or flue boiler is a steam boiler, part of the outer shell of which is exposed to fire or to the products of combustion, and containing flues through which such products pass from the furnace to the uptake.

(h) *Porcupine boiler.* A porcupine boiler is a steam boiler consisting of a vertical shell from which project a number of dead end tubes.

(i) *Factor of safety.* Factor of safety is the ratio of the ultimate strength of the material to the stress maximum allowable.

(j) *Pressure of p. s. i.* Pressure of p. s. i. is the gage pressure or the pressure above the atmospheric pressure in pounds per square inch.

(k) *Design pressure.* Design pressure is the theoretical bursting pressure of the weakest part of a boiler, pressure vessel, or piping divided by its factor of safety.

(l) *Maximum allowable pressure.* The maximum allowable pressure of a boiler and superheater shall be considered as the highest setting of the safety valves.

(m) *Repair.* Repair is the restoration of any damaged or impaired part to an effective and safe condition.

(n) *Alteration.* Alteration is a structural modification of or departure from an approved design or existing construction.

§ 67.01–5 *Drawings.* (a) The manufacturer of any boiler to be used for marine purposes shall furnish the Officer in Charge, Marine Inspection, where such boiler or boilers are to be inspected duplicate blueprints or tracings fully descriptive of same in detail for his approval, one of which shall be kept on file in the inspection office and the other returned to the manufacturer. Where more than one boiler is made from a similar design, a drawing of which is on file in the inspection office, if made at a different date, a reference to such drawing on file is all that shall be required. The manufacturer shall also furnish the Officer in Charge, Marine Inspection, an affidavit on either Form CG 935 or CG 936.

(b) Duplicate blueprints or drawings of water-tube and coil boilers, with their specifications, shall be submitted for approval of the Commandant (under R. S. 4429, 46 U. S. C. 407), and the design approved by the Commandant, before the boilers will be allowed to be used on any vessel coming under the jurisdiction of the Coast Guard. After the approval of the design by the Commandant, 60 certified sets of the blueprints or drawings shall be furnished the Commandant for the use of the inspectors. The blueprints or drawings necessary to comply with the foregoing provisions shall be supplied by the manufacturers. Manufacturers shall furnish Officers in Charge, Marine Inspection, where boilers are to be installed an affidavit certifying that the boilers are constructed in accordance with the specifications approved by the Commandant.

(c) Contractors intending to repair boilers, unfired pressure vessels or appliances installed on vessels subject to inspection by the Coast Guard, shall submit detail drawings in triplicate which shall be fully descriptive of the repair parts of such boilers, unfired pressure vessels, or appliances, to the Officer in Charge, Marine Inspection, having jurisdiction over the vessel. When due to location of the shipyard or design office, such a procedure would result in unnecessary delay in transmission, the drawings may be forwarded directly to the Commandant (MMT), U. S. Coast Guard, Washington 25, D. C.

§ 67.01–10 *Computations.* It shall be the duty of every Officer in Charge, Marine Inspection, to make, for every new boiler inspected in his district, all computations required by the rules and regulations, and any other necessary computations, from data obtained from blueprints or tracings, boiler manufacturers' affidavits, tensile test reports, and from other reliable sources. A record of such computations in full shall be made on letter sheets and filed with blueprints or tracings of boiler, the first sheet of such computations to be headed with a general description of boiler and with the vessel file number.

§ 67.01–15 *Appeals.* In case the repair is disapproved by the Officer in Charge, Marine Inspection, the manufacturer may appeal within 30 days to the Coast Guard District Commander of the district, and should the Coast Guard District Commander sustain the Officer in Charge, Marine Inspection, the manufacturer may further appeal within 30 days to the Commandant. The decision of the Commandant shall be final.

§ 67.01–20 *Materials and workmanship.* All materials to be used for repairs, replacements and for alterations shall be free from injurious defects and shall have a workmanlike finish. The work shall be executed in a workmanlike manner with proper tools or equipment and shall be free from defects which would impair strength or durability.

§ 67.01–25 *Alternative materials or methods of repair.* If, in the development of industrial arts, improved materials or methods of repair are developed, their use in lieu of those specified will be given consideration upon formal application to the Commandant, with full information as to their characteristics, together with such scientific data and evidence as may be necessary to establish the suitability of such materials or methods of repair for the purpose intended.

§ 67.01–30 *Repairs, replacements, or alterations.* (a) No repairs, replacements, or alterations, except emergency repairs, etc., shall be made to boilers, pressure vessels, their mountings or internal fittings, safety valves, piping systems, or pressure appliances without prior approval by the Officer in Charge, Marine Inspection.

(b) Boilers built and installed prior to the adoption of the regulations in this subchapter may be repaired with materials and in the manner specified in this subchapter, except that the use of cast iron valves, mountings or attachments for repairs, replacements, or alterations on existing boilers and steam lines operating at pressures exceeding 30 pounds per square inch is prohibited. Emergency repairs, replacements, or alterations shall be reported as soon as practicable to the Officer in Charge, Marine Inspection, at or nearest the first port where the vessel may call after such repairs are made.

§ 67.01–35 *Boilers built since February 28, 1872.* Boilers built since February 28, 1872, of material stamped and tested according to the requirements of R. S. 4430 (46 U. S. C. 408), and having a record thereof in the office of the Officer in Charge, Marine Inspection, in the district where the boiler was built or intended to be used, may be used for marine purposes, notwithstanding that such boilers may have been used for other purposes, if in the judgment of the Officer in Charge, Marine Inspection, they are deemed safe.

§ 67.01–40 *Inspectors' decisions.* When it becomes necessary for inspectors to make decisions on certain matters covered by the regulations in this subchapter, they shall in making their reports quote the section and paragraph number on which their decisions are based. Whenever it is necessary to make decisions in matters not specifically covered by the regulations in this subchapter, they shall in making their reports state clearly the reasons which caused them to arrive at such decisions.

SUBPART 67.05—CYLINDRICAL SHELLS

§ 67.05–1 *Definitions*—(a) *Cylindrical shell.* The term "cylindrical shell," as used in this subchapter means the cylinder forming the outer envelope of a boiler or other pressure vessel, or of a drum which is a part of a boiler consisting of one or more plates properly riveted, welded, or otherwise joined or of seamless construction as hereinafter specified.

(b) *Course.* A course is a section of a cylindrical shell which comes between circumferential joints.

§ 67.05–5 *Materials.* (a) Plates shall be of boiler steel complying with Subpart 66.10 of this subchapter.

(b) Seamless steel pipe or tubing made by the open-hearth process may be used for shells in the construction of steam and water drums for boilers when the inside diameter of such drums does not exceed 24 inches, provided that the material conforms to the requirements of Subpart 66.35 of this subchapter.

(c) Welded steel pipe of material made by the open-hearth process may be used in the construction of drum shells, provided that the joints are made by the hammer-weld process and the material conforms to the requirements of Subpart 66.30 of this subchapter.

(d) Welded wrought-iron pipe may be used in the construction of drum shells, provided the joints are made by the hammer-weld process and the material conforms to the requirements of Subpart 66.30 of this subchapter.

(e) Copper or brass may be used in the construction of steam drums not exceeding 14 inches in diameter, of a thickness of material not less than five-eighths of an inch, and on the construction of steam drums 12 inches in diameter and under having a thickness of material of not less than ½ inch. All tubes and drums referred to in this paragraph shall be made from ingots or blanks drawn down to size without a seam. Water-tube boilers or generators so constructed may be used for marine purposes with none other than liquid fuel.

(f) Manufacturers furnishing steel piping or tubing for the construction of steam or water drums shall submit a certification that the material furnished conforms to the physical requirements specified in Subpart 66.35 of this subchapter.

§ 67.05–10 *Computations*—(a) *Riveted cylindrical shells.* (1) The maximum allowable pressure on cylindrical shells of boilers constructed of plates inspected as required by this subchapter when single riveted, shall not produce a stress to exceed one-sixth of the tensile strength of the iron or steel plates of which such boilers are constructed; but where the longitudinal laps of the cylindrical parts of such boilers are double riveted, and the rivet holes for such boilers have been fairly drilled instead of punched, an addition of 20 percent to the maximum allowable pressure provided for single riveting shall be allowed.

(2) The maximum allowable pressure for any dimension of boilers shall be ascertained by the following rule, viz: Multiply one-sixth of the lowest tensile strength found stamped on the plates in the cylindrical shell by the thickness, expressed in inches or parts of an inch, and divide by the radius or half diameter, also expressed in inches; and the result will be the pressure allowable per square inch of surface for single riveting, to which add 20 percent where the longitudinal laps of the cylindrical parts of such boiler are double riveted, when all the rivet holes of such boiler, including steam and mud drums, have been fairly drilled and no part of such holes has been punched. The pressure allowed shall be based on the plate whose tensile strength multiplied by its thickness gives the lowest product.

(b) *Seamless or welded drums.* (1) The maximum allowable working pressure and minimum thickness of seamless or welded drums shall be computed from the following formulas:

$$P=\frac{S\times T\times E}{R\times F} \qquad (1)$$

$$T=\frac{P\times R\times F}{S\times E} \qquad (2)$$

where:

P = maximum allowable working pressure, in pounds per square inch.
T = thickness of shell in inches.
S = minimum tensile strength of material in pounds per square inch.
R = inside radius of shell in inches.
F = factor of safety, which is 6.
E = efficiency of join or ligament between tube holes, whichever is the least.

(2) Where seamless piping or tubing is used, the value of E shall equal 1, except in cases where the shell is pierced for tube holes, in which case the value of E shall equal the percentage of strength of the ligament between the tube holes as compared with the solid plate.

(3) Where reinforcing plates are used to strengthen the shell at the point where the tube enters, they shall be riveted to the shell and the value of E shall be determined in the following manner:

(i) The efficiency of the plate section or ligament between tube holes, or

(ii) The shearing strength of the rivets securing the plate to the shell, whichever value is the least.

(4) Where welded piping is used for drum shells as specified in preceding paragraphs, the value of E shall be taken at 0.7, except where the shell is pierced for tube holes and the strength of the ligament falls below 70 percent, in which case the value of E shall be the percentage of strength of the ligament between the tube holes as compared with the solid plate.

(5) Where reinforcing plates are used to strengthen the shell of such welded drums at the point where the tube enters, and the efficiency of the ligament between tube holes or the shearing strength of the rivets securing the reinforcing plate to the shell falls below 70 percent of the strength of the solid plate, the value of E shall be determined in the following manner:

(i) The efficiency of the plate section or ligament between tube holes, or

(ii) The shearing strength of the rivets securing the plate to the shell, whichever value is the least.

(c) *Water-tube or coil boilers.* (1) The maximum allowable pressure on cylindrical shells of water-tube or coil boilers, when such shells have a row or rows of pipes or tubes inserted therein, shall be determined by the following formula: *Provided,* That the pressure allowable on such shells shall also be determined by the rule for cylindrical shells of boilers constructed of inspected plates conforming to Subpart 66.10 of this subchapter, and the lower pressure allowable by the two rules shall be taken:

$$P=\frac{(D-d)\times T\times S}{D\times R} \qquad (3)$$

where:

P = maximum allowable pressure, in pounds per square inch.
D = distance between the tube or pipe centers in a line from head to head, in inches.
d = diameter of hole, in inches.
T = thickness of plate, in inches.
S = one-fourth of the tensile strength of the plate, in pounds per square inch.
R = radius of shell, in inches.
n = number of tube holes in a pitch.

(2) When tubes on any one row are pitched unequally, nd must be substituted in the formula (3) for d.

(3) Where rows of tubes are pitched diagonally, each diagonal ligament shall not be less than three-fifths of each longitudinal ligament.

(d) *Porcupine-type Boilers.* (1) The formula for determining the maximum allowable pressure on boilers of the so-called porcupine and similar types shall be in accordance with this paragraph.

(2) Multiply the vertical distance between the centers of the horizontal rows of tubes in inches by one-half the diameter of shell of boiler in inches, which gives the area upon which the pressure is exerted to break a diagonal ligament, then find the sectional area of the ligament at its smallest part and multiply by one-sixth the tensile strength of the material. This result divided by the area upon which the strain is exerted gives the maximum allowable pressure as follows:

$$P=\frac{STE}{CD} \qquad (4)$$

where:

P = maximum allowable pressure, in pounds per square inch.
E = width of the ligament, in inches.
T = thickness of the material, in inches.
S = one-sixth of the tensile strength, in pounds per square inch.
C = distance between vertical centers, in inches.
D = one-half the inside diameter of the shell of central column, in inches.

SUBPART 67.10—SHELL JOINTS

§ 67.10–1 *Approved types of joints.* (a) Joints of shells of boilers or other pressure vessels are classified as follows:

(1) Riveted joints, which may be either lapped or butt-strapped.

(2) Welded joints, which shall be made by the hammer-weld or other approved process.

§ 67.10–5 *Workmanship.* (a) Centers or guide holes not to exceed 75 percent of the diameter of the full-size finished hole for tubes and stays may be punched. The remainder shall be cleanly cut, drilled, or reamed to full size. Holes not to exceed 4 inches in diameter in plates five-eighths of an inch thick and under may be punched to within ½ inch of the full diameter of the finished hole; the remainder shall be cleanly cut, drilled, or reamed to full size.

§ 67.10–10 *Riveted joints.* (a) The diameter of rivets, rivet holes, distance between centers of rivets, and distance from centers of rivets to edge of lap for different thicknesses of plates for single and double riveting shall be determined by the rules in this section.

(b) The formulas in this section, equivalent to those of the British Board of Trade, are given for the determination of the pitch, distance between rows of rivets, diagonal pitch, maximum pitch, and distance from centers of rivets to edge of lap of single and double riveted lap joints, for both iron and steel boilers.

(c) To determine the pitch for iron plates and iron rivets:

$$p=\frac{d^2\times 0.7854\times n}{T}+d \qquad (1)$$

(d) To determine the distance from center of rivet to edge of lap:

$$E=\frac{3\times d}{2} \qquad (2)$$

(e) To determine the distance between rows of rivets:

(1) The distance between lines of centers of rows of rivets for double, chain-riveted joints (V) shall not be less than twice the diameter of rivet, but it is more desirable that V should not be less than:

$$\frac{4d+1}{2} \qquad (3)$$

(2) For ordinary, double zigzag riveted joints:

$$V=\frac{\sqrt{(11p+4d)\ (p+4d)}}{10} \qquad (4)$$

(f) To determine the diagonal pitch for double, zigzag riveted lap joint; iron and steel:

$$p_d=\frac{6p+4d}{10} \qquad (5)$$

(g) To determine the maximum pitches for riveted lap joints:

(1) For single-riveted lap joints:

$$\text{Maximum pitch}=(1.31\times T)+1\tfrac{5}{8} \qquad (6)$$

(2) For double-riveted lap joints:

$$\text{Maximum pitch}=(2.62\times T)+1\tfrac{5}{8} \qquad (7)$$

where:

p = greatest pitch of rivets, in inches.
n = number of rivets in one pitch.
p_d = diagonal pitch, in inches.
d = diameter of rivets, in inches.
T = thickness of plate, in inches.
V = distance between rows of rivets, in inches.
E = distance from edge of plate to center of rivet, in inches.

(h) To determine the pitch of rivets from the formulas in this section, use the diameter and area of the rivet holes. The diameter of the rivets is the diameter of the driven rivet.

(i) Any riveted joint shall be allowed when it is constructed so as to give an equal percentage of strength to that obtained by the use of the formula given.

§ 67.10–15 *Butt straps.* (a) Where butt straps are used in the construction of marine boilers, the straps for single butt strapping shall in no case be less than the thickness of the shell plates; and where double butt straps are used, the thickness of each shall in no case be less than five-eighths the thickness of the shell plates.

§ 67.10–20 *Welded joints.* (a) Where welded drums are used, the joint shall be so located as not to be in contact with the products of combustion, and shall not be pierced for tube holes.

SUBPART 67.15—HEADS

§ 67.15–1 *Definitions*—(a) *Unstayed heads.* Unstayed heads are the ends of a pressure vessel shell. They may be either flat or dished. Heads may be integral with, riveted, welded, or brazed to the shell.

(b) *Unstayed flat heads.* Unstayed flat heads may be used to close shells as permitted by the regulations in this subchapter.

(c) *Dished heads.* Dished heads may be of circular or elliptical section and may be attached to the shell so that the pressure will be either on the concave or on the convex surface.

(d) *Stayed heads.* Stayed heads are heads supported in whole or in part by stays, furnaces, flues, tubes, etc.

§ 67.15–5 *Materials and workmanship.* (a) Material used in the construction of all bumped heads shall possess the physical and chemical qualities prescribed by the Commandant for all plates subject to tensile strain, as required by R. S. 4430 (46 U. S. C. 408).

(b) To avoid grooving the flanging shall be well rounded at the bend.

(c) Bumped heads may contain a manhole opening flanged inwardly, when such flange is turned to a depth of three times the thickness of material in the head.

(d) All drums attached to coil, pipe, sectional, or water-tube boilers not already in use or actually contracted for, to be built for use on a steam vessel, and their building commenced at or before the date of this rule, shall be required to have the heads of wrought iron or steel or cast steel flanged and substantially riveted to the drums or secured by bolts and nuts of equal strength with rivets, in all cases where the diameters of such drums exceed 6 inches.

(e) Drums and water cylinders constructed with a bumped head at each or either end, any opening in the shell or heads to be reinforced as required by the rules of the Commandant, the circumferential and horizontal seams to be welded and properly annealed after such welding is completed, and when tested with a hydrostatic pressure of at least double the amount of the steam pressure allowed may be used for marine purposes.

§ 67.15–10 *Computations*—(a) *Convex heads.* All plates used as heads, when new and made to practically true circles, and as described below, shall be allowed a maximum pressure in accordance with the following formula:

$$P=\frac{T\times S}{R} \qquad (1)$$

where:

P = Maximum allowable pressure, in pounds per square inch.
T = thickness of plate, in inches.
S = one-fifth of the tensile strength, in pounds per square inch.
R = one-half of the radius to which the head is bumped, in inches.

(b) *Concave heads.* For concave heads the pressure allowable shall be eight-tenths times the pressure allowable for convex heads.

NOTE: To find the radius of a sphere of which the bumped head forms a part, square the radius of head, divide this by the height of bump required; to the result add height of bump, which will equal diameter of sphere, one-half of which will be the required radius.

(c) *Flat heads of wrought-iron or steel plate.* (1) Where flat heads do not exceed 20 inches in diameter they may be used without being stayed, and the maximum pressure allowable shall be determined by the following formula: *Provided,* That flanges are made to an inside radius of at least 1½ inches:

$$P=\frac{C\times T^2}{A} \qquad (2)$$

where:

P = maximum allowable pressure, in pounds per square inch.
T = thickness of material in sixteenths of an inch.
A = one-half the area of head, in square inches.
C = 112 for plates seven-sixteenths of an inch and under.
C = 120 for plates over seven-sixteenths of an inch.

(d) *Requirements for heads (applicable only to rivers).* (1) All heads employed in the construction of cylindrical externally fired boilers for steamers navigating the Red River of the North and rivers whose waters flow into the Gulf of Mexico shall have a thickness of material as follows:

(i) Over 32 inches and not over 36 inches, not less than ½ inch.

(ii) Over 36 inches and not over 40 inches, not less than 9/16 inch.

(iii) Over 40 inches and not over 48 inches, not less than 5/8 inch.

(iv) Over 48 inches, not less than ¾ inch.

(2) The heads of steam and mud drums of such boilers shall have a thickness of material of not less than half an inch.

SUBPART 67.20—OPENINGS AND REINFORCEMENTS

§ 67.20–1 *Material.* (a) The cover plates for manholes and handholes should be of steel conforming to the specifications and requirements for steel plates.

(b) Cast steel may also be used in the construction of manhole and handhole plates.

§ 67.20–5 *Manhole openings.* (a) Manhole openings in front head of ex-

ternally fired boilers under the flues, as required by R. S. 4434, (46 U. S. C. 412), shall be of dimensions of not less than 8 by 12 inches in the clear. Applicable to steamers navigating rivers only.

(b) All boilers built on and after August 1, 1914, shall have a manhole opening above the flues or tubes of not less than 10 by 16 inches, 11 by 15 inches, or of an equal area, in the clear, and shall have such other manhole openings in other parts of the boiler as may be required by the Officer in Charge, Marine Inspection, when considering blueprints or tracings submitted to him for approval of sufficient dimensions to allow easy access to the interior of the boiler for the purpose of inspection and examination.

§ 67.20–10 *Reinforced openings.* (a) When holes exceeding 6 inches in diameter are cut in boilers for pipe connections, manhole and handhole plates, such holes shall be reinforced, either on the inside or outside of boiler, with reinforcing wrought-iron steel rings, which shall be securely riveted or properly fastened to the boiler, such reinforcing material to be rings of sufficient width and thickness of material to fully compensate for the amount of material cut from such boilers, in flat surfaces; and where such opening is made in the circumferential plates of such boilers, the reinforcing ring shall have a sectional area equal to at least one-half of the sectional area of the opening parallel with the longitudinal seams of such portion of the boiler. On boilers carrying 75 pounds or less steam pressure a cast-iron stop valve, properly flanged, may be used as reinforcement to such opening. When holes are cut in any flat surface of such boilers and such holes are flanged inwardly to a depth of not less than 1½ inches, measuring from the outer surface, the reinforcement rings may be dispensed with.

(b) When reinforcing rings as described above are made of wrought-iron or steel, the material shall not be required to be tested.

(c) Seamless forged steel nozzles may be used for reinforcing holes cut in boilers when the amount of material in the flange of the saddle that is secured to the boiler is equal to the amount of material removed from the boiler.

(d) No connection between shell of boiler and mud drum shall exceed 9 inches in diameter and the flange of the mud-drum leg shall consist of an equal amount of material to that cut out of the shell of boiler.

SUBPART 67.25—STAYS AND STAYED SURFACES

§ 67.25–1 *Definitions.*—(a) *Through stay.* Through stay is a solid bar extended through both heads of a boiler and threaded at the ends for attachment by means of nuts. With this type of stay the ends are usually upset to compensate for the threading. (See Figure 67.25–1 (a).)

(b) *Solid staybolt.* Solid staybolt is a threaded bar screwed through the plates, the ends being riveted over or fitted with nuts or welded collars. (See Figure 67.25–1 (b).)

(c) *Hollow staybolt.* Hollow staybolt is a hollow threaded bar screwed through the plates, the ends being riveted over or fitted with nuts or welded collars. (See Figure 67.25–1 (c).)

(d) *Flexible staybolt.* Flexible staybolt is a bar made with ball-and-socket joint on one end, the cup of the socket being screwed into the outside sheet and covered with a removable cap, the plain end of the staybolt being threaded, screwed through the inside sheet and riveted over. (See Figure 67.25–1 (d).)

(e) *Sling stay.* Sling stay is a flexible stay consisting of a solid bar having one or both ends forged for a pin connection to a crowfoot or other structural fitting secured to the stayed plate. (See Figure 67.25–1 (e).)

(f) *Crowfoot.* Crowfoot is a forged fitting with palms or lugs secured to the head to form a proper connection with a sling stay. (See Figure 67.25–1 (f).)

(g) *Crowfoot stay.* Crowfoot stay is a solid bar stay terminating in a forged fork with palms or lugs for attachment to the plate. (See Figure 67.25–1 (g).)

(h) *Diagonal stay.* Diagonal stay is a bar or formed plate forged with palms or lugs for staying the head of the boiler to the shell diagonally. (See Figure 67.25–1 (h).)

(i) *Gusset stay.* Gusset stay is a triangular plate used for the same purpose as a diagonal stay and attached to the head and the shell by angles, flanges, or other suitable means of attachment. (See Figure 67.25–1 (i).)

(j) *Dog stay.* Dog stay is a staybolt, one end of which extends through a girder, dog, or bridge, and is secured by a nut, the other end being screwed through the plate which it is supporting and riveted over or fitted with a nut or welded collar. (See Figure 67.25–1 (j).)

(k) *Girder.* Girder is a bridge, built up of plates or structural shapes separated by distance pieces, a forging, of a formed plate, which spans an area requiring support abutting thereon and supporting the girder stays or staybolts. (See Figure 67.25–1 (k).)

(l) *Welded collar.* Welded collar is a beveled ring formed around the end of a screw stay by means of arc or gas welding. It is used in lieu of a nut. (See Figure 67.25–1 (l).)

(m) *Reinforcement.* Reinforcement is a doubling plate, washer, structural

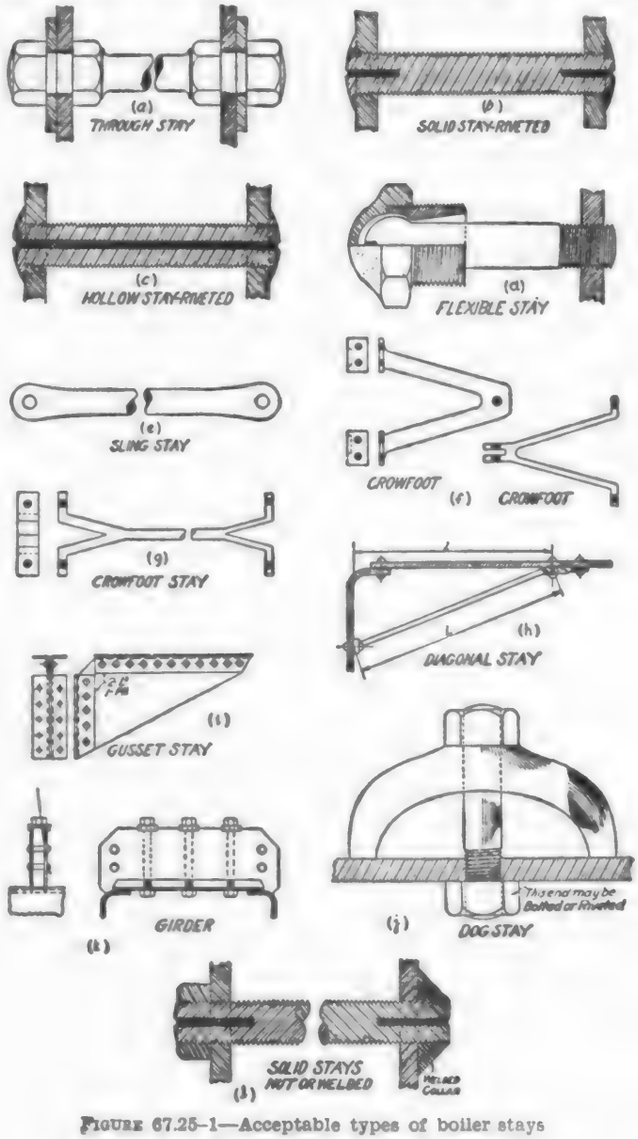


FIGURE 67.25–1—Acceptable types of boiler stays

shape, or other form for stiffening or strengthening a plate.

(n) *Stay tube.* Stay tube is a thick-walled tube used in fire-tube boilers to stay the tube sheets.

(o) *Telltale hole.* Telltale hole is a small hole having a diameter not less than 3/16 inch drilled in the center of a solid stay and extending to at least 1/2 inch beyond the inside surface of the sheet.

(p) *Stayed surfaces.* Surfaces to be stayed or reinforced include the following:

(1) Flat plates, heads, or areas thereof, such as segments of heads, wrapper sheets, furnace plates, side sheets, combustion chamber tops, etc., which are not self-supporting.

(2) Curved plates constituting the whole or parts of a cylinder subject to external pressure which are not entirely self-supporting.

§ 67.25–5 *Materials and workmanship.* (a) All steel bars to be used as stays or braces in marine boilers and allowed a stress of 7,000, 8,000, or 9,000 pounds per square inch shall be tested by inspectors at the mills where the material is manufactured in compliance with Subpart 66.15 of this subchapter.

(b) Stay bolts and stays made of the best quality of refined wrought iron may be welded. The lengthening of steel stays by welding shall not be allowed.

(c) All screw stay bolts shall be drilled at the ends with a three-sixteenths-inch hole to at least a depth of one-half inch beyond the inside surface of the sheet. Stays through laps or butt straps may be drilled with larger hole to a depth so that the inner end of said larger hole shall not be nearer than the thickness of the boiler plates from the inner surface of the boiler. Hollow-rolled screw stay bolts may be used.

(d) Flexible stay bolts that are made with a ball in socket on one end, the socket screwed into the outside sheet and covered with a removable cap and bolt screwed into the inside sheet and riveted over, may be used for staying flat surfaces without being drilled with a telltale hole.

(e) Holes for screw stays shall be tapped fair and true, and full thread.

(f) The ends of stays which are upset to include the depth of thread shall be thoroughly annealed after being upset.

§ 67.25–10 *Stays.* (a) The maximum allowable pressure for stays used in the construction of marine boilers where same are accurately fitted normal to supported surfaces and properly secured shall be ascertained by the following formula:

$$P=\frac{A\times C}{a} \qquad (1)$$

where:

P = maximum allowable pressure, in pounds per square inches.

A = least cross-sectional area of stay, in square inches.

a = area of surface supported by one stay, in square inches.

C = a constant.

C = 9,000 for tested steel stays 1 inch and upward in diameter when such stays are not forged or welded. The ends may be upset to a sufficient diameter to allow for the depth of the thread. The diameter shall be taken at the bottom of the thread, provided it is the least diameter of the stay. All such stays after being upset shall be thoroughly annealed.

C = 8,000 for a tested Huston or similar type of brace, the cross-sectional area of which exceeds 5 square inches.

C = 7,000 for such tested braces when the cross-sectional area is not less than 1.227 and not more than 5 square inches, provided such braces are prepared at one heat from a solid piece of plate without welds.

C = 7,500 for wrought-iron stays 1 inch and upward in diameter when made of the best quality of refined iron. The ends may be upset to allow for the depth of the thread. The diameter shall be taken at the bottom of the thread, provided it is the least diameter of the stay. Such stays may be welded.

C = 6,000 for welded crowfoot stays when made of best quality of refined wrought-iron, and for all stays not otherwise provided for when made of the best quality of refined iron or of steel without welds.

(b) The required cross-sectional area of a diagonal or gusset stay shall be determined by the following formula:

$$A=\frac{a\times L}{l} \qquad (2)$$

where:

A = sectional area of diagonal stay, in square inches.

a = sectional area of direct stay, in square inches.

L = length of diagonal stay, in inches.

l = length of line drawn at right angles to boiler head or surface supported to center of palm of diagonal stay, in inches.

(c) When sling stays are connected by pins to angles secured to shell (see Figures 67.30–10 (d) (1) and (2)), said angles shall be of sufficient depth to resist shear. Section to resist shear shall be determined by the following formulas:

$$A=D\times 2T \qquad (3)$$

$$D=\frac{A}{2T} \qquad (4)$$

where:

A = sectional area of pin, in square inches.

D = depth from edge of pinhole to end of leg in inches.

$2T$ = thickness of two angles, in inches.

(d) Minimum diameter of rivets shall be found as follows:

Minimum diameter =

$$\sqrt{\frac{\text{load}}{0.7854\times 12{,}000\times N}} \qquad (5)$$

where:

N = number of rivets. Rivets shall be staggered in each leaf.

(e) The sectional area of gusset stays, when constructed of triangular right-handed web plates secured to single or double angle bars along the two sides at right angles, shall be determined by formula for diagonal stays, and shall be not less than 10 percent greater than would be necessary for a diagonal bolt stay.

(f) The diameter of a screw stay shall be taken at the bottom of the thread, provided it is the least diameter of the stay.

(g) For all stays the least sectional area shall be taken in calculating the stress allowable.

(h) The sectional area of pins to resist double shear and bending, accurately fitted and secured in crowfeet, sling, and similar stays, shall be at least equal to eight-tenths of the required sectional area of the brace. Breadth across each side and depth to crown of eye shall be not less than 0.35 of diameter of pin. In order to compensate for inaccurate distribution the forks shall be proportioned to support two-thirds of the load, thickness of forks to be not less than 0.66 of the diameter of pin.

(i) The combined sectional area of rivets used in securing tee irons and crowfeet to shell, said rivets being in tension, shall be not less than the required sectional area of brace. To insure a well-proportioned rivet point, rivets shall be of sufficient length to completely fill the rivet holes and form a head equal in strength to the body of the rivet. All rivet holes shall be drilled. Distance from center of rivet hole to edge of tee irons, crowfeet, and similar fastenings shall be so proportioned that the net sectional areas through sides at rivet holes shall equal the required rivet section. Rivet holes shall be slightly countersunk in order to form a fillet at point and head.

§ 67.25–15 *Stayed surfaces.* (a) All stayed surfaces formed to a curve the radius of which is over 21 inches, excepting surfaces otherwise provided for, shall be deemed flat surfaces.

(b) (1) The maximum allowable pressure on flat plates supported by stays shall be determined by the following formula:

$$P=\frac{C\times T^2}{p^2} \qquad (1)$$

(2) When pitches of stays are unequal, $\frac{A^2+B^2}{2}$ is to be taken instead of p^2.

where:

P = maximum allowable pressure, in pounds per square inch.

p = pitch of stays when equal space in both directions, in inches.

B = distance between two rows of stays, in inches.

T = thickness of plates in sixteenths of an inch.

C = 112 for screw stays with riveted heads, plates 7/16 inch thick and under.

C = 120 for screw stays with riveted heads, plates above 7/16 inch thick.

C = 120 for screw stays with nuts, plates 7/16 of an inch thick and under.

C = 125 for screw stays with nuts, plates 7/16 of an inch thick and under 9/16 inch.

C = 135 for screw stays with nuts, plates, 9/16 inch thick and above.

$C = 160$ for stays with washers or doubling strips which have a thickness of at least 0.5 of the thickness of the plate and a diameter of at least 0.5 of the greatest pitch of the stay, riveted to the outside of the plates, and stays having one nut inside of the plate and one nut outside of the washer or doubling strip. For T take 72 percent of the combined thickness of the plate and washer or plate and doubling strip.

$C = 175$ for stays with double nuts, having one nut on the inside and one nut on the outside of the plate, without washers or doubling plates.

$C = 200$ for stays fitted with doubling plates which have a thickness equal to at least 0.5 of the thickness of the plate reinforced, and covering the full area braced (up to the curvature of the flange, if any), riveted to either the inside or outside of the plate, and stays having one nut outside and one inside of the plates. Washers or doubling plates to be substantially riveted. For T take 72 percent of the combined thickness of the two plates.

$C = 200$ for stays with plates stiffened with tees or angle bars having a thickness of at least two-thirds the thickness of plate and depth of webs at least one-fourth of the greatest pitch of the stays, and substantially riveted on the inside of the plates, and stays having one nut inside bearing on washers fitted to the edges of the webs that are at right angles to the plate. For T take 72 percent of the combined thickness of web and plate.

SUBPART 67.30—COMBUSTION CHAMBERS AND TUBE SHEETS OF FIRE-TUBE BOILERS

§ 67.30–1 *Definitions*—(a) *Combustion chamber.* Combustion chamber, within the meaning of this section, is that part of an internally-fired boiler in which combustible gases may be burned after leaving the furnace.

(b) *Separate combustion chamber.* Separate combustion chamber is a combustion chamber which is connected to one furnace only.

(c) *Common combustion chamber.* Common combustion chamber is a combustion chamber connected to two or more furnaces in a boiler.

(d) *Crown or top plate.* Crown or top plate is the top of a combustion chamber and is usually supported by girder stays or by sling stays or braces.

(e) *Wrapper sheet.* Wrapper sheet is the side plate of any type of combustion chamber and also the bottom plate of a common combustion chamber.

(f) *Curved bottom plate.* Curved bottom plate is the bottom of a separate combustion chamber formed to an arc of a circle and usually designed to be self-supporting.

(g) *Combustion chamber tube sheet.* Combustion chamber tube sheet is the plate, forming the end of a combustion chamber in which the tubes are secured.

(h) *Combustion chamber back sheet.* Combustion chamber back sheet is the plate opposite the tube sheet forming the back of the combustion chamber. It is usually stayed to the back head of the boiler by means of screw stays, or, in the case of double-ended boilers, to the back of the combustion chamber of the other end of the boiler.

(i) *Structural stiffeners.* Structural stiffeners are rolled shapes or flanged plates which are used to stiffen a surface which is not entirely self-supporting.

§ 67.30–5 *Materials.* All plates forming parts of combustion chambers of fireboxes shall conform to the general specifications for the shell plates.

§ 67.30–10 *Computations*—(a) *Curved bottom plate with reinforcement.* (1) Where rounded bottoms of combustion chambers are stiffened with single angle-iron stiffeners, such angles shall have a thickness of leaf eight-tenths that of the plate and a depth of at least one-half pitch. Where stiffened with double angle irons or tee bars, such angles or tee bars shall have a thickness of leaf at least two-thirds that of plate and a depth of at least one-fourth of pitch. Said angles or tee bars shall be substantially riveted to the plate supported. Where the bottom of combustion chambers are strengthened by angles or tee irons, the same shall be on the water side of the combustion chambers, as shown in the sketches in this section.

(2) Where rounded tops of combustion chambers are stiffened with single or double angle-iron stiffeners or tee bars, such angles or tee bars shall be of thickness and depth of leaf not less than specified for rounded bottoms of combustion chambers. Said angles or tee bars shall be supported on thimbles and riveted through with rivets not less than 1 inch in diameter and spaced not to exceed 6 inches between centers.

(3) Maximum allowable pressure on rounded surfaces supported by angle-

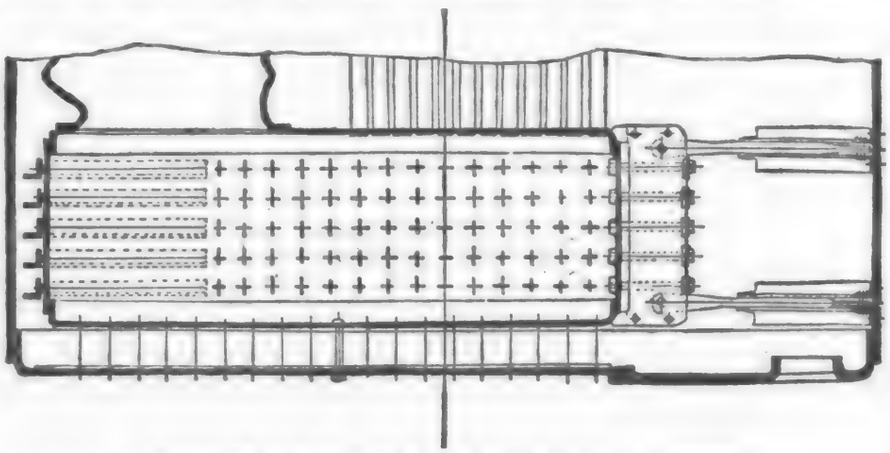


FIGURE 67.30–10 (d1)—Full load on tube sheet and backplate.

Diameter of hangers should be sufficient to carry the weight of combustion chamber and one-half the tubes and furnaces when no water is in boiler. No effect of buoyancy is considered.

These remarks are for separate combustion chambers when they are not secured to the shell at the bottom and therefore liable to bend the small screw stays.

In this case the tube sheet and backplate get the full compressive load in a similar manner to a boiler without hanging stays.

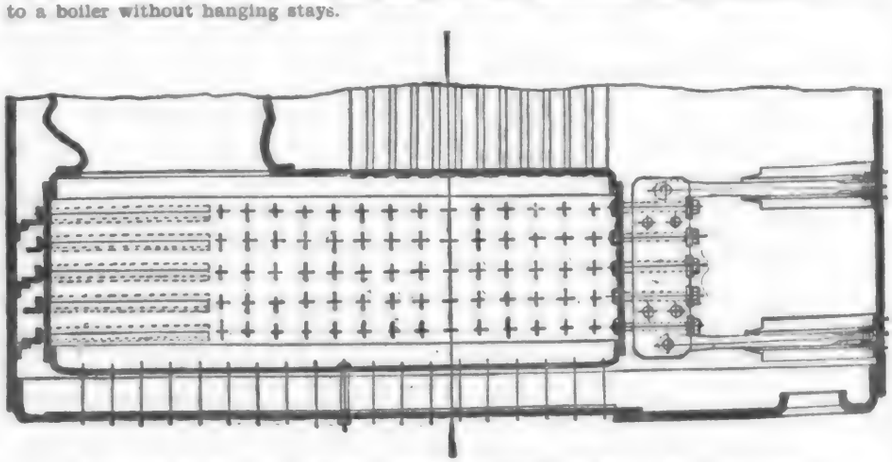


FIGURE 67.30–10 (d2)—Nearly whole compressive load taken off tube sheet.

Top hanging stays take full compressive load off tube sheet and backplate, except that half the load on unsupported portions marked B beyond stays will be taken by the tube sheet and backplate, respectively, and the other half by the last stays.

The thickness of tube sheet and backplate may be materially reduced from what would be required when tube sheet and backplate take full compressive load, providing that combustion chamber is well stayed to take full load at the bottom by screw stays or girders of plates and angles.

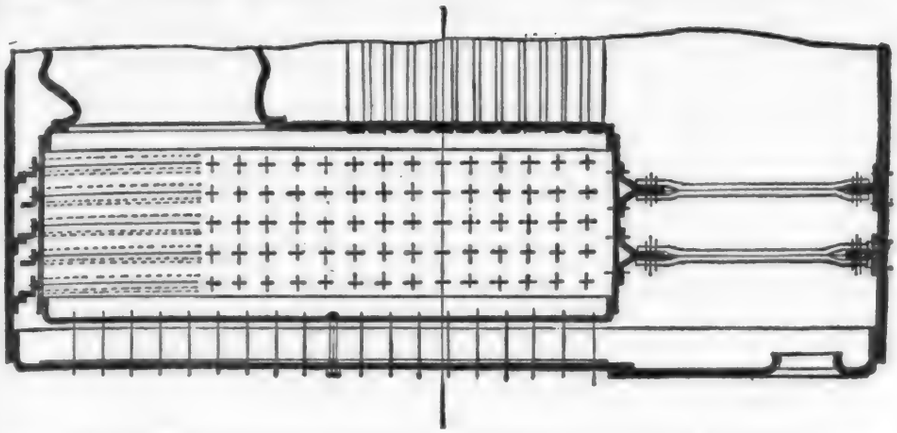


FIGURE 67.30-10 (d3)—Nearly whole compressive load taken off tube sheet.

Top hanging stays take full compressive load off tube sheet and backplate, except that half the load on unsupported portions marked B beyond stays will be taken by the tube sheet and backplate, respectively, and the other half by the last stays.

The bottom stays, whether of screw stays or girders of plates and angles, must be of the same sectional area as the top braces, and no boiler should be built having top stays as shown without having the bottom stays of equal strength.

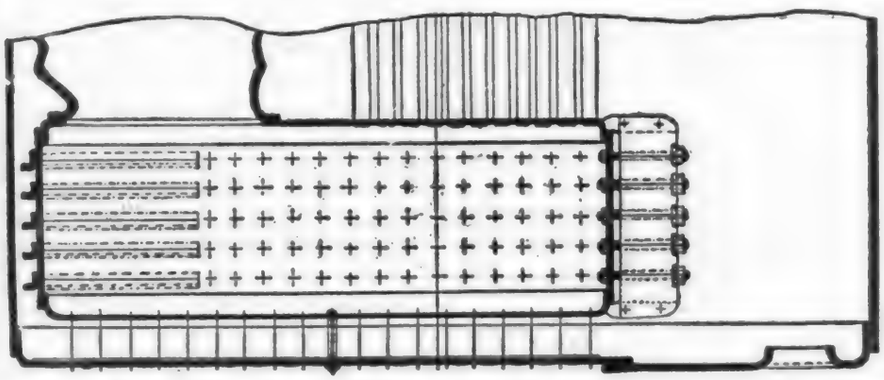


FIGURE 67.30-10 (d4)—Tube sheet and backplate get full load, and therefore should be heavy enough to withstand such.

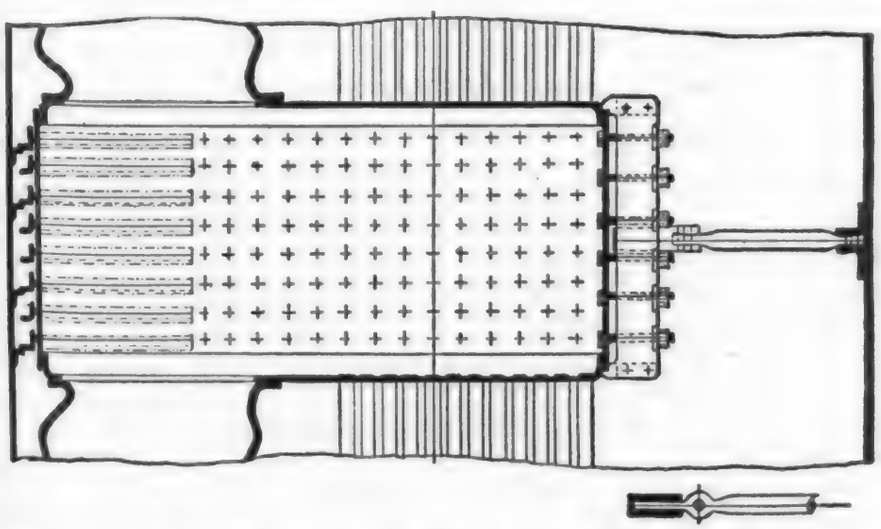


FIGURE 67.30-10 (d5)—Tube sheets each take part of compressive load, the hanging stays taking care of the other part.

The bottom stays, whether of screw stays or girders of plates and angles, must be of the same sectional area as the top braces.

In this case the thickness of the tube sheets may be materially reduced from what would be required when tube sheets together take full compressive load.

irons or tee bars shall be determined by the following formula:

$$P=\frac{900\times T^2}{p\times D} \quad (1)$$

where:

P=maximum allowable pressure, in pounds per square inch.
T=thickness of plate in sixteenths of an inch.
p=pitch of angle or tee stiffeners, in inches.
D=diameter of curve to which plate is bent, in inches.

(b) *Curved bottom plate without reinforcement.* The maximum allowable pressure and the minimum thickness of round bottom of combustion chambers, angles being omitted, shall be computed by the following formulas:

$$P=\frac{50(300T-2L)}{D} \quad (2)$$

$$T=\frac{P\times D+100L}{15{,}000} \quad (3)$$

where:

P=maximum allowable pressure, in pounds per square inch.
T=thickness of bottom plate of combustion chamber, in inches.
L=extreme length of plate forming bottom of combustion chamber, in inches.
D=twice outside radius of bottom of combustion chamber, in inches.

(c) *Tube sheets.* (1) Maximum allowable pressure on tube sheets where combustion chambers are not suspended from the shell of the boiler shall be determined by the following formula:

$$P=\frac{(D-d)\,T\times 27{,}000}{W\times D} \quad (4)$$

where:

P=maximum allowable pressure, in pounds per square inches.
D=least horizontal distance between tube centers, in inches.
d=inside diameter of tubes, in inches.
T=thickness of tube plate, in inches.
W=extreme width of combustion chamber, in inches.

(2) The compressive stress on tube plates, as determined by the following formula, shall not exceed 13,500 pounds per square inch, when pressure on top of combustion chamber is supported by vertical plates of such chamber.

$$S=\frac{P\times D\times W}{2(D-d)\,T} \quad (5)$$

where:

S=compressive stress on tube sheet, in pounds per square inch.
P=maximum allowable pressure, in pounds per square inch.
D=least horizontal distance between tube centers, in inches.
d=inside diameter of tube, in inches.
W=extreme width of combustion chamber, in inches.
T=thickness of tube sheet, in inches.

(d) *Girders or crown bars.* (1) The maximum allowable pressure for girders or crown bars supporting the tops of combustion chambers shall be determined by the following formula:

$$P=\frac{C\times d^2\times T}{(W-p)\times D\times L} \quad (6)$$

where:

P=maximum allowable pressure, in pounds per square inch.
W=extreme width of combustion box, in inches.

p=pitch of supporting bolts, in inches.
D=distance between girders from center to center, in inches.
L=length of girder in feet between supports.
d=depth of girder, in inches.
T=thickness of girder, in inches.
C=550 when the girder is fitted with 1 supporting bolt.
C=825 when the girder is fitted with 2 or 3 supporting bolts.
C=917 when the girder is fitted with 4 or 5 supporting bolts.
C=963 when the girder is fitted with 6 or 7 supporting bolts.
C=990 when the girder is fitted with 8 or more supporting bolts.

(2) Sling stays may be used in lieu of girders in all cases: *Provided, however,* That when such sling stays are used, girders or screw stays of the same sectional area shall be used for securing the bottom of combustion chamber to the boiler shell.

(3) When girders are dispensed with and the top and bottom of combustion chambers are secured by sling stays or braces, the sectional area of such stays shall conform with the requirements of § 67.25–10.

(4) The following drawings show an excellent practice of constructing combustion chambers with and without sling stays.

SUBPART 67.35—FURNACES AND FLUES

§ 67.35–1 *Definitions*—(a) *Furnace.* Furnace, within the meaning of this subpart, is a firebox or a large flue in which the fuel is burned.

(b) *Corrugated furnace.* Corrugated furnace is a cylindrical shell wherein corrugations are formed circumferentially for additional strength and to provide for expansion. (See Figures 67.35–1 (b1), 67.35–1 (b2), 67.35–1 (b3), 67.35–1 (b4), 67.35–1 (b5).)

(c) *Purves ribbed furnace.* Purves ribbed furnace is a cylindrical shell in which ribs or projections are formed circumferentially to provide additional strength. (See Figure 67.35–1 (c).)

(d) *Adamson ring furnace.* Adamson ring furnace is a cylindrical shell made in short sections, the ends of the sections being flanged and riveted together through a reinforcing ring. (See Figure 67.35–1 (d).)

(e) *Plain furnace.* Plain furnace is a cylindrical shell usually made in sections united by means of riveted joints. (See Figure 67.35–1 (e).)

(f) *Flues.* Flues are cylindrical shells made of seamless or welded tubing, or with a riveted longitudinal joint, the ends being attached by rivets. Their purpose is to provide additional heating surface and to form a path for the products of combustion. (See Figure 67.35–1 (e).)

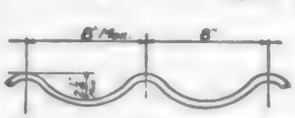


FIGURE 67.35–1 (b1)—Leeds suspension bulb furnace.

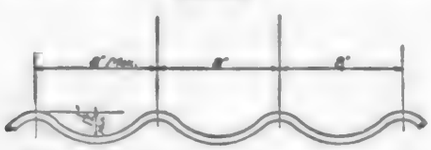


FIGURE 67.35–1 (b2)—Morison furnace.

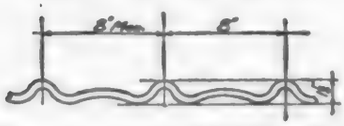


FIGURE 67.35–1 (b3)—Deighton furnace.

FIGURE 67.35–1 (b4)—Fox furnace.

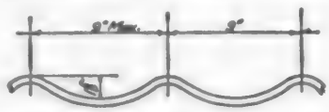


FIGURE 67.35–1 (b5)—Brown furnace.

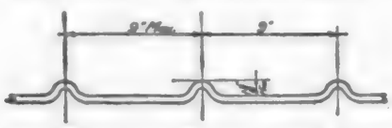


FIGURE 67.35–1 (c)—Purves ribbed furnace.

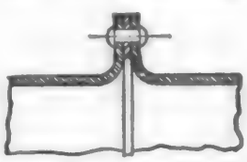


FIGURE 67.35–1 (d)—Adamson ring furnace.

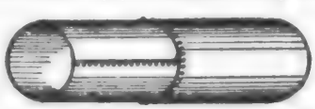


FIGURE 67.35–1 (e)—Circular riveted flue.

§ 67.35–5 *Materials.* (a) All furnaces and flues shall be constructed of steel plates conforming to the requirements of Subpart 66.10 of this subchapter.

(b) The tensile strength of steel used in the construction of corrugated or ribbed furnaces shall not exceed 67,000 p. s. i. and be not less than 54,000 p. s. i.; and in all other furnaces the minimum tensile strength shall not be less than 58,000 p. s. i. and the maximum not more than 67,000 p. s. i. The minimum elongation in 8 inches shall be 20 percent.

§ 67.35–10 *Computations*— (a) *Corrugated or ribbed furnaces.* All corrugated furnaces having plain parts at the ends not exceeding 9 inches in length (except flues especially provided for), when new, and made to practically true circles, shall be allowed a maximum pressure in accordance with the following formula:

$$P=\frac{C\times T}{D} \qquad (1)$$

where:
P=maximum allowable pressure in pounds per square inch.
T=thickness in inches, not less than five-sixteenths of an inch.
D=mean diameter, in inches.
C=Constant, as follows:
C=17,300, determined from an actual destructive test under the supervision of the Commandant, when corrugations are not more than 8 inches from center to center and not less than 2¼ inches deep, for Leeds Suspension bulb furnace.
C=determined from an actual destructive test under the supervision of the Commandant, when corrugations are not more than 8 inches from center to center and the radius of the outer corrugations is not more than one half of the suspension curve, for Morison furnace. [In calculating the mean diameter of the Morison furnace, the least inside diameter plus 2 inches may be taken as the mean diameter.]
C=15,600 when corrugations are not more than 8 inches from center to center and not less than 1½ inches deep, for Deighton furnace.
C=14,000, when corrugations are not more than 8 inches from center to center and not less than 1½ inches deep, for Fox furnace.
C=14,000, when rib projections are not more than 9 inches from center to center and not less than 1⅜ inches deep, for Purves furnace. [In calculating the allowable pressure for a Purves furnace, the thickness shall be not less than seven-sixteenths, and D shall be taken as the least outside diameter.]
C=14,000, determined from an actual destructive test under the supervision of the Commandant, when corrugations are not more than 9 inches from center to center and not less than 1⅜ inches deep, from Brown furnace. [In calculating the allowable pressure for Brown furnace D shall be taken as the least outside diameter.]

(b) *Corrugated furnaces having sections 18 inches long.* When furnaces are corrugated by sections not more than 18 inches from center to center, the maximum allowable pressure shall be in accordance with the following formula:

$$P=\frac{C\times T}{D} \qquad (2)$$

where:
P=maximum allowable pressure, in pounds per square inch.
T=thickness in inches, not less than seven-sixteenths.
D=mean diameter, in inches.
C=10,000, a constant, when corrugated by sections not more than 18 inches from center to center and not less than 2½ inches deep, measuring from the least inside to the greatest outside diameter of the corrugations and having the ends fitted one into the other and substantially riveted together: *Provided,* That the plain parts at the ends do not exceed 12 inches in length.

(c) *Adamson furnace.* The maximum allowable pressure for Adamson furnaces made in sections of not less than 18 inches in length shall be determined by the following formula:

$$P=\frac{57.6}{D}[(18.75\times T)-1.03\times L)] \qquad (3)$$

where:
P=maximum allowable pressure, in pounds per square inch.
D=outside diameter of furnace, in inches.
L=length of section, in inches.
T=thickness of plate, in sixteenths of an inch.

(d) *Spherical-top furnaces.* The minimum thickness and maximum allowable pressure of furnaces of 20 inches in diameter and over, when tops are portions of spheres and made in one plate, shall be determined by the following formula:

$$T=\frac{P\times R}{10{,}000}+0.12 \qquad (4)$$

$$P=\frac{(T-0.12)\times 10{,}000}{R} \qquad (5)$$

where:
P=maximum allowable pressure, in pounds per square inch.
T=thickness of plate when constructed of one plate, in inches.
R=radius of curvature, in inches.
E=efficiency riveted joint when end of furnace is constructed of more than one plate, the thickness will be T/E.

(e) *Plain circular riveted flues, furnaces, and cone tops.* (1) The maximum allowable pressure of cylindrical riveted flues and furnaces made in sections of not less than 18 inches in length fitted one into the other and substantially riveted, combustion chambers for vertical submerged tubular boilers in the shape of a frustum of a cone, constructed to a practically true circle, shall be the following formula:

$$P=\frac{51.5}{D}[(18.75\times T)-(1.03\times L)] \quad (6)$$

where:
P=maximum allowable pressure, in pounds per square inch.
D=outside diameter of furnaces, or outside mean diameter of cone top, in inches.
L=length of section or flue, in inches.
T=thickness of furnace or cone top, in sixteenths of an inch, not to be less than five-sixteenths of an inch.

(2) When diameter of plain furnaces and flues used in vertical type of boilers or mean diameter of cone tops exceed 42 inches, they shall be deemed a flat surface and must be stayed in accordance with rules governing flat surfaces. If a greater working pressure than given by formula is desired for mean diameters under 42 inches, the flues or cone tops shall be substantially stayed for such additional pressure.

(f) *Plain, lapwelded steel flues, 7 to 18 inches in diameter.* (1) Maximum allowable pressures and corresponding minimum thickness of wall for long, plain, lapwelded and seamless steel flues 7 to 18 inches diameter, subjected to external pressure only, shall be determined by the Table 65.35–10 (f) and formula (7).

TABLE 67.35–10 (f)

Outside diameter of flue	Maximum allowable pressure, in pounds per square inch						
	100	120	140	160	180	200	220
	Thickness of flue in inches. Safety factor, 5						
Inches:							
7	0.152	0.160	0.168	0.177	0.185	0.193	0.201
8	.174	.183	.193	.202	.212	.220	.229
9	.196	.206	.217	.227	.237	.248	.258
10	.218	.229	.241	.252	.264	.275	.287
11	.239	.252	.265	.277	.290	.303	.316
12	.261	.275	.289	.303	.317	.330	.344
13	.283	.298	.313	.328	.343	.358	.373
14	.301	.320	.337	.353	.369	.385	.402
15	.323	.343	.361	.378	.396	.413	.430
16	.344	.366	.385	.404	.422	.440	.459
17	.366	.389	.409	.429	.448	.468	.488
18	.387	.412	.433	.454	.475	.496	.516

(2) Thickness in Table 67.35–10 (f) were calculated by formula:

$$T=\frac{[(F\times P)+1{,}386]\ D}{86{,}670} \quad (7)$$

where:
D=outside diameter of flue, in inches.
T=thickness of wall, in inches.
P=maximum allowable pressure, in pounds per square inch.
F=factor of safety.

(3) This formula (7) is applicable to lengths greater than six diameters of flue, to pressures greater than 100 pounds, to outside diameters of from 7 to 18 inches, and to temperatures less than 650° F.

(4) The maximum allowable pressure shall be determined by the following formula:

$$P=\frac{(T\times 86{,}670)-(1{,}386\times D)}{D\times F} \quad (8)$$

where:
P=maximum allowable pressure, in pounds per square inch.
D=outside diameter of flue, in inches.
T=thickness of wall, in inches.
F=factor of safety.

(g) *Riveted flues over 6 and not over 18 inches in diameter, made in sections, and subjected to external pressure only.* The maximum allowable pressure on riveted flues constructed of plates made in sections, not less than 24 inches in length, over 6 and not exceeding 18 inches in diameter, shall be determined by the following formula:

$$P=\frac{8{,}100\times T}{D} \quad (9)$$

where:
P=maximum allowable pressure, in in pounds per square inch.
T=thickness in inches, minimum thickness not less than 0.25 inch.
D=outside diameter, in inches.

(h) *Riveted, seamless, or lapwelded flues over 18 and not over 28 inches in diameter, made in sections, and subjected to external pressure only.* The maximum allowable pressure on riveted, seamless, or lapwelded flues over 18 inches in diameter up to and including 28 inches in diameter, made in sections not less than 24 inches in length, efficiently riveted together, sections not to exceed 3½ times the diameter of the flue, when subjected to external pressure only, shall be determined by the following formula:

$$P=\frac{51.5}{D}[(18.75\times T)-(L\times 1.03)] \quad (9)$$

where:
P=maximum allowable pressure, in pounds per square inch.
D=outside diameter of flue, in inches.
L=length of flue in inches, not to exceed 3½ diameters of flue.
T=thickness of wall, in sixteenths of an inch.

(i) *Steam chimneys.* (1) When steam chimneys constructed of flues subject to external pressure have a thickness of not less than seven-sixteenths of an inch, and the flue is heated only with the waste gases, and the temperature does not exceed 600 degrees F., the maximum allowable pressure shall be determined by the rules for plain furnaces or flues, corrugated furnaces, and Adamson type.

(2) When flues are strengthened with tee irons, angle irons, or bowling rings the pressure shall be determined by formula for plain furnace flues. When angle or tee bars are used they shall have a thickness of leaf of at least two-thirds that of plate and a depth of at least one-fourth of pitch. Said tee bars shall be substantially riveted to flue. All rivet holes in tees shall be drilled, holes shall be staggered, distance from center of rivet holes to edge of tees shall be not less than 1.5 times diameter of rivet holes, and percentage of plate section shall be not less than rivet section. Bowling rings may be used, as they increase the strength and provide for expansion of flue. For all boilers carrying a steam pressure of over 60 pounds and not over 100 pounds per square inch the flue may be braced with socket bolts in lieu of tee rings. Such bolts shall have heads and the ends shall be threaded for nuts, with plate washers or equivalent on the inside of flue. Pitch of stays and bolts and the maximum stress in pounds allowable per square inch of cross-sectional area for stays and bolts shall be determined by Subpart 67.25.

(3) If a greater allowable stress is desired on flues than that permitted by the formula for flues strengthened with bowling rings or tee irons, the flue may be braced to shell and may be deemed a flat surface, and shall be stayed in strict accordance with the rules for stays.

§ 67.35–15 *Detail requirements.* (a) The thickness of corrugated and ribbed furnaces shall be ascertained by actual measurement. The manufacturer shall have said furnaces drilled for a three-eighths inch pipe tap and fitted with a screw plug that can be removed by the inspector when taking this measurement. For the Brown and Purves furnaces the holes shall be in the center of the second flat; for the Morison, Fox, and other similar types, in the center of the top corrugation, at least as far in as the fourth corrugation from the end of the furnace.

(b) (1) When plain horizontal flues are made in sections not less than 18 inches in length, and not less than five-sixteenths of an inch thick, and flanged to a depth of not less than three times the diameter of rivet holes plus the radius at furnace wall (inside diameter of furnace), the thickness of the flanges shall be as near the thickness of the body of the plate as practicable.

(2) The radii of the flanges on the fire side shall be not less than three times the thickness of plate. The distance from the edge of the rivet hole to the

edge of the flange shall be not less than the diameter of the rivet hole, and the diameter of the rivets before driven shall be at least one-fourth inch larger than the thickness of the plate.

(3) The depth of the ring between the flanges shall be not less than three times the diameter of the rivet holes, and the ring shall be substantially riveted to the flanges. The fire edge of the ring shall terminate at or about the point of tangency to the curve of the flange, and the thickness of the ring shall be not less than one-half inch.

(c) When lapwelded or seamless flues over 5 inches in diameter are used in externally fired boilers over 20 feet in length, they may be allowed to be made in two pieces joined together by (1) a standard screwpipe coupling or sleeve, or by (2) swelling the end of one section of the flue sufficiently to permit it to lap over the other section not less than 4 inches and be double riveted, or by (3) butting the two sections of the flue together and fitting a band or butt strap not less than 8 inches in length equally divided over the joint of the two sections, and of a thickness of the flue, and double riveted to each section. When any of the above methods are used on more than one flue in a boiler, the couplings or sleeves shall not be allowed to come opposite, and the distance measured between any such flues and between any such flues and the shell shall be made by measuring between the plates in the flues and the plates in the shell. It shall be the duty of the inspectors to see that the flues are well screwed into the couplings or sleeves, so as to have the ends of flues as near together as is practicable.

(d) Drainpipes shall be fitted to steam chimneys in which water is liable to collect. Steam chimneys that are arranged to be disconnected from main boiler shall be provided with a safety valve not less than 3 inches in diameter and with a steam gage, and shall be provided with manholes to enable inspectors to examine every portion of the interior.

SUBPART 67.40—BOILER AND SUPERHEATER TUBES

§ 67.40–1 *Definitions*—(a) *Tubes.* Tubes, within the meaning of this subpart, are cylindrical shells of comparatively small diameter constituting the main part of the heating surface of a boiler or superheater.

(b) *Safe end.* Safe end is a short piece of boiler tube which is usually thicker than the ordinary tube and is welded to a tube of lighter gauge for the purpose of lengthening it.

(c) *Seamless tube.* Seamless tube is a tube without any longitudinal joint.

(d) *Lap-welded tube.* Lap-welded tube made with a longitudinal rolled or hammered lap-welded joint.

(e) *Stay tube.* Stay tube is a thick-walled tube, the end of which is usually thickened by upsetting to compensate for threading. Such tubes are used for staying tube sheets into which they are screwed and expanded.

(f) *Expanding.* Expanding is the process of enlarging the end of a tube to make it fit tightly in the tube sheet.

(g) *Beading.* Beading is the process of turning over the protruding end of a tube after expanding to form a supporting collar for the tube sheet.

(h) *Bell-mouthing.* Bell-mouthing is the process of flaring the end of a tube beyond where it is expanded in the tube sheet.

§ 67.40–5 *Materials and workmanship.* (a) Seamless steel boiler tubes shall comply with the requirements of Subpart 66.25 of this subchapter.

(b) Lap-welded steel and wrought-iron boiler tubes shall comply with the requirements of Subpart 66.20 of this subchapter for such tubes.

(c) Seamless copper or brass tubes not exceeding three-fourths of an inch in diameter may be used in the construction of water-tube boilers or generators when liquid fuel is used.

§ 67.40–10 *Computations*—(a) *Lap-welded and seamless tubes.* Lap-welded and seamless tubes used in boilers whose construction was commenced after June 30, 1910, and having a thickness of material according to their respective diameters, shall be allowed a maximum pressure as prescribed in Table 67.40–10 (a), provided they are deemed safe by the inspectors.

TABLE 67.40–10 (a)

Outside diameter (inches)	Thickness of material, inches	Maximum pressure allowed, p. s. i.	Outside diameter (inches)	Thickness of material, inches	Maximum pressure allowed, p. s. i.
2	0.095	427	3½	0.120	308
2¼	.095	380	3¾	.120	282
2½	.109	392	4	.134	303
2¾	.109	356	4½	.134	238
3	.109	327	5	.148	235
3¼	.120	332	6	.165	199

(b) Where heavier material is used a maximum pressure may be allowed as prescribed in § 67.35–10 (f), for determining the pressure of plain, lap-welded steel flues, 7 to 18 inches in diameter.

(c) Any length of tube is allowable.

§ 67.40–15 *Safe-ending.* No tube increased in thickness by welding one tube inside of another shall be allowed for use, but the ends of boiler tubes may be welded on for the purpose of making repairs or new tubes may be welded for the purpose of making them longer: *Provided,* That such welding is not made by any process of autogenous welding.

SUBPART 67.45—SAFETY VALVES

§ 67.45–1 *Definitions*—(a) *Safety valve.* Safety valve is a valve designed to open automatically to relieve excess pressure in the boiler or pressure vessel to which it is attached.

(b) *Spring loaded safety valve.* Spring loaded safety valve is a safety valve fitted with a spring to hold the valve against its seat and allows it to open at a given pressure. This term applies to pop safety valves of various forms.

(c) *Lever safety valve.* Lever safety valve is a safety valve having the disk held on its seat by the action of a weight hung on a lever which is pivoted on a fulcrum.

(d) *Relief valve.* Relief valve is a valve constructed on the general design of safety valves to relieve excess pressure. It may be used for service where an approved safety valve is not required by the regulations of this subchapter.

§ 67.45–5 *General requirements.* (a) After June 30, 1928, no type of safety valve shall be used on any vessel coming under the jurisdiction of this service that has not been approved by the Commandant.

(b) The manufacturers of safety valves shall file an affidavit with the Commandant that the safety valves manufactured by them will be in all respects in accordance with the blueprints and specifications on file in the office of the Commandant, and shall permanently attach a name plate to the valves that shall show the name of the manufacturer, the pressure the casing is guaranteed to stand, diameter, seat area, serial number, and capacity.

(c) The valves shall be so arranged that each boiler shall have at least one separate safety valve, unless the arrangement is such as to preclude the possibility of shutting off the communication of any boiler with the safety valve or valves employed. This arrangement shall also apply to lockup safety valves when they are employed.

(d) The use of two safety valves may be allowed on any boiler, provided the combined area of such valves is equal to that required by rule for one such valve. Whenever the area of a safety valve, as found by the regulations in this subpart, is greater than that corresponding to 4½ inches in diameter, two or more safety valves, the combined area of which shall be equal at least to the area required, shall be used.

(e) Before any safety valve is put into service it shall be subjected to a pressure of one and one-half times the pressure it is to be subjected to when in actual service.

(f) Safety valves when fitted either to the shell of boiler or steam drum may be fitted with internal dry pipes when made of standard steam pipe or of riveted material equal in thickness, and when the combined openings in the dry pipe equal in area at least one and one-half times the opening of the valve.

(g) Where escape pipes for safety valves are installed after July 1, 1926, the area of the escape pipes shall be at least equal to the area of the outlet furnished with the safety valve, and in no case shall the area be less than the area of inlet. The fitting shall be as short and straight as possible, and so arranged as to avoid undue stress upon the valve. Where the escape pipe is used for two or more safety valves, the area of the escape pipe shall equal the combined areas of all the safety valves.

(h) Hereafter no safety valves having a set-screw arrangement on top of the valve casing, designed to hold the valve down while the hydrostatic pressure is being applied, shall be allowed. On such valves now in use, inspectors shall require the set screws to be taken out and the hole permanently closed. This does not apply to any safety valve whose form

of construction is such that the hole for the set screw or bolt is securely closed when the valve is locked.

§ 67.45–10 *Detail requirements.* (a) (1) The areas of all safety valves on boilers contracted for or the construction of which commenced on or after June 1, 1904, shall be determined in accordance with the following formula and table:

$$a = 0.2074 \times \frac{W}{P} \quad (1)$$

where:

a = area of safety valve, per square foot of grate surface, in square inches.

W = pounds of water evaporated per square foot of grate surface per hour.

P = absolute pressure, in pounds per square inch = maximum allowable gage pressure 15.

(2) The areas required per square foot of grate surface in the Table 67.45–10 (a) have been computed from the formula by assuming the different valves of W and P.

TABLE 67.45–10 (a)—AREA OF SAFETY VALVES REQUIRED PER SQUARE FOOT OF GRATE SURFACE FOR DIFFERENT PRESSURES AND RATES OF EVAPORATION

P, absolute pressure, pounds per square inch	Gage pressure, pounds per square inch	These figures represent evaporation in pounds per square foot of grate surface per hour (W) = pounds water evaporated per pound coal × pounds coal burned per square foot of grate surface per hour														
		100	120	140	160	180	200	220	240	260	280	300	320	340	360	380
		The figures below give (a), the area in square inches required per square foot of grate surface at above rate of evaporation														
65	50	0.319	0.383	0.447	0.510	0.574	0.638	0.702	0.765	0.829	0.893	0.956				
70	55	.296	.355	.414	.474	.533	.592	.652	.711	.769	.828	.888				
75	60	.276	.332	.387	.442	.497	.552	.608	.663	.718	.773	.829				
80	65	.259	.311	.363	.415	.466	.518	.570	.622	.674	.726	.778				
85	70	.244	.292	.341	.390	.438	.487	.536	.585	.634	.682	.731				
90	75	.230	.276	.322	.368	.414	.460	.506	.552	.598	.644	.690				
95	80	.218	.262	.305	.349	.392	.436	.479	.523	.567	.610	.654				
100	85	.207	.249	.290	.332	.373	.414	.456	.497	.538	.580	.622				
105	90	.197	.236	.276	.316	.355	.394	.434	.473	.513	.552	.592				
110	95	.188	.226	.264	.301	.339	.377	.414	.452	.489	.527	.565				
115	100	.180	.216	.252	.288	.324	.360	.396	.432	.468	.504	.540				
120	105	.172	.207	.241	.276	.311	.345	.379	.414	.448	.483	.517				
125	110	.166	.199	.232	.265	.298	.331	.364	.397	.431	.463	.497				
130	115	.160	.192	.223	.255	.287	.319	.351	.383	.415	.447	.479				
135	120	.153	.184	.215	.246	.276	.307	.337	.368	.398	.429	.460				
140	125	.148	.177	.207	.237	.266	.296	.325	.355	.385	.414	.444				
145	130	.143	.172	.201	.229	.258	.287	.315	.344	.372	.401	.430				
150	135	.138	.166	.194	.222	.249	.277	.304	.332	.360	.387	.415				
155	140	.134	.160	.187	.214	.241	.268	.294	.321	.348	.375	.401				
160	145	.130	.156	.181	.207	.233	.259	.285	.311	.337	.363	.389				
165	150	.126	.151	.176	.201	.226	.251	.276	.301	.326	.352	.378				
170	155	.122	.146	.171	.195	.219	.244	.268	.292	.317	.341	.366				
175	160	.118	.142	.166	.189	.213	.236	.260	.284	.308	.331	.355				
180	165	.115	.138	.161	.184	.207	.230	.254	.277	.300	.323	.346				
185	170	.112	.135	.157	.179	.202	.224	.247	.269	.291	.314	.336				
190	175	.109	.131	.153	.175	.196	.218	.240	.262	.284	.306	.328				
195	180	.106	.128	.149	.170	.191	.213	.234	.255	.277	.298	.319				
200	185	.104	.124	.145	.166	.187	.207	.228	.249	.270	.290	.310				
205	190	.101	.121	.142	.162	.182	.202	.223	.243	.263	.283	.303				
210	195	.099	.119	.138	.158	.178	.198	.217	.237	.257	.277	.297				
215	200	.096	.116	.135	.154	.173	.193	.212	.231	.250	.269	.289	.308	.327	.347	.366
220	205	.094	.113	.132	.151	.170	.189	.208	.226	.245	.264	.283	.302	.321	.340	.358
225	210	.092	.110	.129	.147	.166	.184	.203	.221	.240	.258	.276	.295	.314	.332	.350
230	215	.090	.108	.126	.144	.162	.180	.198	.216	.235	.253	.270	.289	.307	.325	.343
235	220	.088	.106	.124	.141	.159	.176	.194	.212	.229	.247	.264	.282	.300	.318	.336
240	225	.086	.104	.121	.138	.155	.173	.190	.207	.225	.242	.259	.276	.294	.311	.329
245	230	.085	.102	.119	.135	.152	.170	.186	.203	.220	.237	.254	.271	.288	.305	.322
250	235	.083	.100	.117	.133	.149	.167	.183	.199	.216	.233	.249	.266	.282	.299	.315
255	240	.081	.098	.114	.130	.146	.163	.179	.195	.211	.228	.244	.261	.277	.293	.309
260	245	.080	.096	.112	.128	.144	.160	.176	.192	.208	.224	.240	.255	.271	.287	.303
265	250	.078	.094	.110	.125	.141	.157	.172	.188	.203	.219	.235	.250	.266	.282	.298
270	255	.077	.092	.107	.123	.138	.153	.169	.184	.199	.215	.230	.245	.261	.276	.291
275	260	.075	.090	.105	.121	.136	.151	.166	.181	.196	.211	.226	.241	.256	.271	.286
280	265	.074	.089	.104	.118	.133	.148	.163	.178	.192	.207	.222	.237	.251	.266	.281
285	270	.073	.087	.102	.116	.131	.146	.160	.175	.189	.204	.218	.233	.247	.262	.276
290	275	.072	.086	.100	.114	.129	.143	.157	.172	.186	.200	.214	.228	.242	.257	.271
295	280	.070	.084	.098	.112	.127	.141	.154	.169	.182	.196	.210	.224	.238	.253	.267
300	285	.069	.083	.096	.110	.124	.138	.151	.166	.179	.193	.207	.221	.235	.249	.263
305	290	.068	.082	.095	.109	.122	.136	.149	.163	.177	.190	.204	.217	.231	.245	.258
310	295	.067	.080	.093	.107	.120	.134	.147	.160	.174	.187	.201	.214	.227	.241	.254
315	300	.066	.079	.092	.105	.118	.132	.145	.158	.171	.184	.197	.210	.223	.237	.250

(3) The areas (a) shown in Table 67.45–10 (a) multiplied by square feet of grate surface give the area of safety valve or valves required. When this calculation results in an off size of safety valve, use next larger standard size.

(b) The area of a safety valve for boilers using oil as fuel or for boilers designed for any evaporation per hour shall be computed by dividing the total number of pounds of water evaporated per hour by any number of pounds of water evaporated per square foot of grate surface per hour (W) taken from, and within the limits of Table 67.45–10 (a). This will give the equivalent number of square feet of grate surface for boiler for estimating the area of valve. Then apply the table for determining the area of the safety valve.

(c) Where safety valves are used with beveled seats, the seats shall have an angle of inclination of 45° to the center of their axes. Flat-seat safety valves may be used under the formula and table prescribed in this subpart. The discharge capacity of a flat-seat valve shall be 1.4 times that allowed for a bevel-seat valve.

§ 67.45–13 *Lever safety valves.* (a) All common lever safety valves to be hereafter applied to the boilers of steam vessels shall be constructed in material, workmanship, and principle according to the requirements for a safety valve referred to in this section. When this construction of a safety valve is applied to the boilers of steamers navigating rough waters, the link may be connected direct with the spindle valve: *Provided, always,* That the fulcrum or points upon which the lever rests are made of steel, knife, or sharp-edged, and hardened; in this case the short end of the lever shall be attached directly to the valve casing. In all cases the link requires but a slight movement not exceeding ⅛ inch.

(b) All the points of bearing on lever shall be in the same place.

(c) The distance of the fulcrum shall in no case be less than the diameter of the valve opening.

(d) The length of the lever shall not exceed the distance of the fulcrum multiplied by ten.

(e) The width of the bearings of the fulcrum shall be not less than ¾ inch.

(f) The length of the fulcrum link shall be not less than 4 inches.

(g) The lever and fulcrum link shall be made of wrought-iron or steel and the knife-edged fulcrum points and bearings for the points shall be made of steel and hardened. But the chambers and saddle flanges of this and all other types of safety valves attached to boilers may be made of cast iron or other suitable material.

(h) The valve, valve seat, and bushing for the stem or spindle shall be made of composition (gun metal) when the valve is intended to be attached to a boiler using salt water; but when the valve is to be attached to a boiler using

fresh water and generating steam of a high pressure the parts named, with the exception of the bushings for the spindle, may be made of cast iron.

(i) The valve shall be guided by its spindle, both above and below the ground seat and above the lever, through supports either made of composition (gun metal) or bushed with it. The spindle shall fit loosely in the bearings or supports.

(j) When the valve is intended to be applied to the boilers of steamers navigating rough waters, the fulcrum link may be connected directly with the spindle of the valve; providing always that the knife-edged fulcrum points are made of steel and hardened, and that the vertical movement of the valve is unobstructed by any lateral movement.

(k) In all cases the weight shall be adjusted on the lever to the pressure of steam allowed in each case by a correct steam gage attached to the boiler. The weight shall then be securely fastened in its position and the lever marked for the purpose of facilitating the replacing of the weight should it be necessary to remove the same, and in no case shall a line or any other device be attached to the lever or weight except in such a manner as will enable the engineer to raise the valve from its seat.

§ 67.45–15 *Spring-loaded safety valves.* Any spring-loaded safety valve constructed so as to give an increase lift by the operation of steam after being raised from its seat, or any spring-loaded safety valve constructed in any other manner, so as to give an effective area equal to that of the afore-mentioned spring-loaded safety valve, may be used in lieu of the common lever-weighted valve on all boilers on steam vessels, and each spring-loaded valve shall be supplied with a lever that will raise the valve from its seat a distance of not less than that equal to one-eighth of the diameter of the valve opening; but in no case shall any spring-loaded safety valve be used in lieu of the lever-weighted safety valve without first having been approved by the Commandant.

SUBPART 67.50—BOILER MOUNTINGS AND ATTACHMENTS

§ 67.50–1 *Definitions*—(a) *Mountings.* Mountings, within the meaning of this subchapter, are nozzle connections, distance pieces, valves, or fittings attached directly to the boiler.

(b) *Main stop valve.* Main stop valve is a valve usually connected directly to the boiler for the purpose of shutting off the steam from the main steam line.

(c) *Auxiliary stop valve.*—Auxiliary stop valve is a valve usually connected directly to the boiler for the purpose of shutting off the steam from the auxiliary lines (including the whistle lines).

(d) *Manifold.* Manifold is a fitting with two or more branches having valves either attached by bolting or integral with the fitting.

(e) *Feed valve.* Feed valve is a valve in the feed-water line which controls the boiler feed.

(f) *Blow-off valve.* Blow-off valve is a valve connected directly to the boiler for the purpose of blowing out water, scum, or sediment.

(g) *Dry pipe.* Dry pipe is a perforated or slotted pipe placed in the highest part of the steam space of a boiler to prevent priming.

(h) *Water column.* Water column is a fitting or tube equipped with a water glass attached to a boiler for the purpose of indicating the water level.

(i) *Test cocks.* Test cocks are small cocks on a boiler for indicating the water level.

(j) *Salinometer cocks.* Salinometer cocks are cocks attached to a boiler for the purpose of drawing off a sample of water for salinity tests.

(k) *Fusible plugs.* Fusible plugs are plugs made with a bronze casing and a tin filling which melts at a temperature of 450 degrees to 500 degrees F. They are intended to melt in the event of low water and thus warn the engineer on watch.

§ 67.50–5 *Detailed requirements.* (a) Where the thickness of the material in the boiler or drum, or the heads thereof, is not less than ½ inch, or where such boiler, drum, or head thereof has been reinforced by having a pad or flange riveted on the same, to make the thickness not less than ½ inch, pipes or fittings of 2 inches in diameter or under may be screwed directly into the same. Where steam or feed pipes of 2 inches in diameter or under are screwed into the boiler, the stop valve shall be connected to the boiler by as short a nipple as it is possible to use, nipples to be of extra-heavy thickness.

(b) All boiler connections of over 2 inches in diameter, except the connections for safety valves, shall be permanently flanged and attached directly to the boiler by bolts, studs, or rivets.

(c) Where the connecting point on the boiler is of circular form, distance pieces shall be allowed in order to square the point of the flanged fittings.

(d) Flanged distance pieces of not more that 8 inches between flanges may be allowed between stopcocks or valves and the boiler when necessary to care for and conveniently handle the valves, when such distance pieces are constructed of wrought material of sufficient thickness and strength to withstand any pressure to which they may be subjected and securely riveted to the boiler.

(e) Cast-steel flanged fittings, when conforming strictly with the requirements for steel castings, may be used for the purpose of connecting main and auxiliary stop valves and other steam outlets, including safety valves, distance from axis of outlets of such fittings to point of connection with boiler to be as short as practicable.

(f) All valves and fittings over 2 inches diameter shall be flanged and properly secured at point of connection with boiler by bolts, studs, or rivets, and no fitting shall be of greater length than specified by the "Manufacturers' Standard."

(g) Cast nozzles shall not be used when exposed to the direct action of the fire.

(h) On all boilers built after July 1, 1896, a stopcock or value shall be placed between all check valves and boiler, and between all steam and water pipes and boiler. Valves of 2 inches diameter or less connected directly to the boiler shall be of cast steel, hard brass, or bronze.

(i) The use of malleable-iron or cast-steel manifolds, tees, return bends, or elbows in the construction of pipe generators shall be allowed, and the pressure of steam shall not be restricted to less than one-half the hydrostatic pressure applied to pipe generators unless a weakness should develop under such test as would render it unsafe in the judgement of the inspector making such inspection.

§ 67.50–10 *Superheaters.* (a) The headers of superheaters may be made of semisteel (so-called) in which the constituent part of high-grade uniform steel thereof shall be not less than 25 percent and that the material shall have a tensile strength of not less than 28,000 pounds per square inch. The material shall be soft and close-grained and the castings shall be tight under a hydrostatic pressure of 850 pounds per square inch.

(b) When interdeck superheaters are used in connection with water-tube boilers of approved design, and the fittings and pipes between the drum of the boilers and the header of the superheaters are made of seamless steel and of a thickness in accordance with the rules to withstand any pressure sustained by any part of the boiler, such fittings connecting with pipes of steam drum or superheater shall be either steel forgings or steel castings. The stop valve may be attached to the discharge end of the superheater: *Provided,* That this section shall not apply to safety valves that have been approved by the Commandant.

§ 67.50–15 *Feed connections.* Feed water shall not be admitted into any marine boiler at a temperature less than 100 degrees F., and every such boiler, excepting donkey boilers, shall after October 31, 1909, have an independent auxiliary feed appliance for supplying said boiler with water in addition to the usual mode employed, which auxiliary feed shall enter the boiler through an opening and a fitting which are entirely independent of the fitting and opening for the main feed.

§ 67.50–20 *Fusible plugs.* (a) Fusible plugs for use in boilers of steam vessels under the jurisdiction of the Coast Guard shall be made of a bronze casing with the bore tapering continuously and evenly from end to end, and filled from end to end with tin not less than 99.3 percent pure and to contain not more than 0.1 percent zinc, 0.1 percent lead, or 0.5 percent copper, and in no case shall it contain more than 0.7 percent total impurities. The small end of the bore may be countersunk not more than ¼ inch in depth and width, but no recess thread, or cavity other than this countersink shall be allowed.

(b) Fusible plugs, except those which are hereafter provided for, shall have an external diameter of not less than ¾ inch pipe tap, and the filling shall be at least ½ inch in diameter at the smaller end, and shall have a larger diameter at the opposite end of the plug: *Provided,* That all fusible plugs fitted in boilers carrying a steam pressure exceeding 150 pounds to the square inch may be re-

duced at the smaller end of the filling to 5/16 of an inch in diameter.

(c) Every boiler other than boilers of the water-tube type shall be fitted with at least two fusible plugs as described above, and located as follows:

(1) Upright boilers shall be fitted with two fusible plugs of an external diameter of not less than 3/8 inch pipe tap, the filling to be at least 1/4 inch in diameter at the smaller end and shall have a greater diameter at the opposite end. The fusible plugs shall be located in separate tubes not more than 2 inches below the lowest gage cock.

(2) Externally heated cylindrical boilers, with flues, shall have one plug in the top of the upper flue, not more than 4 feet from the back end of the flue, and shall also have a plug fitted to the shell of the boiler immediately below the fire line, and not less than 4 feet from the front end: *Provided*, That when the flues are not more than 6 inches in diameter fusible plugs of not less diameter than 3/8 inch pipe tap may be used in such flues.

(3) Fire-box, scotch, and other types of shell boilers not specially provided for, having a combustion chamber common to all furnaces, shall have two plugs fitted to the crown sheet of the combustion chamber at or near the center of the crown sheet and not more than 12 inches apart.

(4) Double-end boilers with separate combustion chambers, each of which combustion chamber is common to all furnaces in its own end of the boiler, shall have two plugs fitted to the crown sheet of each combustion chamber at or near the center of the crown sheet, and not more than 12 inches apart.

(5) Boilers fitted with a separate combustion chamber for each individual furnace shall be fitted with a fusible plug in the center of the crown sheet of each combustion chamber.

(6) Boilers of types not herein provided for shall be fitted with at least two fusible plugs of such dimensions and located in such parts of the boiler as will, in the judgment of the Officer in Charge, Marine Inspection, best meet the purposes for which they are intended.

(d) Fusible plugs shall be renewed at each annual inspection, but in cases where the plugs were installed or renewed not more than 6 months prior to the annual inspection, they may be allowed until the next following annual inspection or for a period not to exceed 18 months. In such cases, however, the inspector shall satisfy himself at the annual inspection that the plugs are in such condition as to warrant their continued use until the next annual inspection, after which the plugs shall be renewed at each and every annual inspection.

(e) Fusible plugs shall be so fitted that the smaller end of the filling is exposed to the fire, and shall be at least 1 inch higher on the water side than the plate or flue in which they are fitted.

(f) Notwithstanding anything which may be contained in this section, fusible plugs shall be so fitted that the end of the filling on the water end of the plug is not less than 1 inch above the dangerous low-water level.

(g) Each manufacturer of fusible plugs shall number all plugs in accordance with the number of the heat from which the plugs were filled. For instance, the first pouring shall be number 1, and all plugs filled from this head shall be numbered 1; the next pouring shall be number 2, and all the plugs filled from this heat shall be numbered 2, etc.

(h) The heat number shall be plainly stamped on each end of filling with numbers not less than 1/12 inch in height.

(i) Manufacturers of fusible plugs shall furnish the Commandant a sample plug from each heat for examination and test, but where more than 250 plugs are poured from the same heat, a sample plug shall be furnished for each 250 plugs or fraction thereof. The samples furnished shall bear the same number for any one heat and shall represent the heat from which the sample is poured.

(j) (1) In transmitting samples of fusible plugs to the Commandant, the fusible plugs and the letters of transmittal shall be addressed as follows: "The Commandant (MMT), U. S. Coast Guard, Washington, D. C."

(2) One letter of transmittal shall be required for each heat. In letter of transmittal the following information shall be stated:

(i) Number of heat.

(ii) Number of fusible plugs manufactured from the heat.

(iii) Number of samples of fusible plugs from the heat transmitted.

(iv) Name of manufacturer or initials stamped on casing of plug.

(k) (1) Manufacturers of fusible plugs shall stamp on the larger end or face of the casing their name or initials for identification and shall file with the Commandant a certificate duly sworn to that such plugs are filled with tin of the character required by this subpart and made in accordance therewith.

(2) Following is a general form of affidavit to be followed by manufacturers of fusible plugs:

STATE OF ----------,
County of ----------.

I hereby certify, on this ---------- day of ----------, 195--, that I am ----------, of the (State owner or name position) manufactory of ----------, at ---------- in the State of ----------; that all fusible plugs furnished for use in boilers of steam vessels under the jurisdiction of the Coast Guard by the said manufactory will be filled with tin of the character required, and will be made in accordance with the rules and regulations of the Commandant governing the manufacture of fusible plugs and that I am authorized to make this certificate.

(Signature of manufacturer)

Subscribed and ---------- to before me this ---------- day of ----------, 195--.

[SEAL] (Signature) ----------
(Notary Public)

(l) The certificate shall be executed by some person having authority to make the statements contained therein.

(m) On receipt of a properly executed affidavit by the Commandant, the inspectors of the Coast Guard and the merchant marine generally shall be notified.

(n) All replacement or renewal of fusible plugs shall be manufactured from acceptable heats in conformance with Subpart 162.014 of Subchapter Q (Specifications) of this chapter.

§ 67.50–25 *Gage cocks and water glass.* (a) All boilers, except flash boilers, shall be supplied with at least one reliable water gage, and at least three gage cocks attached directly to each boiler. When the gage glass and gage cocks are connected to the boilers by a water column there shall be three additional gage cocks inserted in the head or shell of boiler. The lower gage cock in boilers more than 48 inches in diameter shall be not less than 4 inches above the top of the flues, tubes, or combustion chambers. In boilers less than 48 inches in diameter the lower gage cock shall be not less than 2 1/2 inches above the top of the flues, tubes, or combustion chambers. A gage glass shall be considered a reliable water gage, and a float such as used on western river steamers shall be considered on such boilers as a reliable water gage: *Provided*, That when water-tube boilers have an efficient water column connected to the steam drum of said boiler at the top and the water manifold at the bottom, and such water column has a gage glass and three gage cocks fitted to same, and also is fitted with a valve or stopcock, both at top and bottom where the column is connected to the boiler, no gage cocks shall be required in the head or shell of the drums of such water-tube boilers.

(b) Double-end boilers shall have at least three gage cocks and one water glass at each end.

(c) In vertical boilers of the water-tube type the location of the lowest gage cock shall be determined by the Officer in Charge, Marine Inspection.

§ 67.50–30 *Steam gages.* All boilers or sets of boilers shall have attached to them at least one gage that will correctly indicate a pressure of steam equal to 80 percent of the hydrostatic pressure applied by the inspectors.

SUBPART 67.55—EVAPORATORS, FEED-WATER HEATERS, SEPARATORS, AND STEAM TRAPS MADE OF CAST IRON AND SUBJECT TO BOILER PRESSURE

§ 67.55–1 *Computations.* (a) When evaporators, feed heaters, separators, and steam traps are constructed of cast iron possessing a tensile strength of not less than 20,000 pounds per square inch, the shells being cylindrical and ends flat or convex, the castings sound and of uniform thickness, the maximum allowed pressure shall be determined by the following formulas:

(1) For flat surface:

$$P=\frac{20{,}000\times T^2}{D^2} \quad (1)$$

$$T=\frac{P\times D^2}{20{,}000} \quad (2)$$

(2) For cylindrical shell:

$$P=\frac{3{,}500\times T}{D} \quad (3)$$

$$T=\frac{P\times D}{3{,}500} \quad (4)$$

where:

P = maximum allowable pressure in pounds per square inch.
T = thickness, in inches.
D = diameter inside, in inches. When the pressure is to be determined for a part of a flat surface which is a square, or rectangle in the flat-surface formula, the value of D used shall be the diagonal of the square or rectangle, and when the ends are bolted to the shell the value of D used shall equal the diameter of the bolt circle.

(b) The thickness of ends of evaporators, feed heaters, and separators shall be not less than ⅜ inch. To the resultant thickness obtained by the formula given above there shall be added, for cylinders having an inside diameter of 1 inch to 6 inches, inclusive, ¼ inch; for cylinders having an inside diameter of over 6 inches to 15 inches, inclusive, ⅛ inch.

(c) All flanges shall be substantial, and there shall be a good fillet all around the root, and when the ends and shell are cast solid there shall be a good and substantial fillet inside all around.

(d) The bolts or studs for the ends or doors shall not have a greater stress than 6,000 pounds per square inch, and the size of bolts or studs shall be not less than ¾ inch in diameter.

§ 67.55–5 *Evaporators.* Evaporators shall be provided with an efficient safety valve of approved type, set to blow at the maximum pressure to which the evaporator will be subjected in service, and it shall be the duty of the engineer in charge of the vessel to see that such valve blows off at least once in 30 days.

PART 68—PIPING SYSTEMS

Chapter I is amended by adding a new Part 68 to Subchapter G reading as follows:

SUBPART 68.01—GENERAL

Sec.

68.01–1 Scope.
68.01–5 Definitions.
68.01–10 Affidavit.

SUBPART 68.05—DETAIL REQUIREMENTS

68.05–1 Material.
68.05–5 Computations.
68.05–10 Valves and fittings.
68.05–13 Joints and flanged connections.
68.05–15 Installation.
68.05–20 Fuel oil filling and transfer system.
68.05–25 Fuel-oil service systems.
68.05–30 Vent piping.
68.05–35 Sounding pipes.
68.05–40 Welded piping.

AUTHORITY: §§ 68.01–1 to 68.05–40 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4430, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 690, 41 Stat. 305, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–408, 411, 412, 435, 489, 366, 363, 367, 463a, 1333, 50 U. S. C. 1275.

SUBPART 68.01—GENERAL

§ 68.01–1 *Scope.* (a) This part contains requirements for the various ships' piping and appurtenances.

(b) The respective piping systems installed on vessels shall have the necessary pumps, valves, regulating valves, safety valves, relief valves, flanges, fittings, pressure gages, liquid level indicators, thermometers, etc., for safe and efficient operation of the vessel.

§ 68.01–5 *Definitions*—(a) *Piping.* The word "piping" within the meaning of this subchapter, refers to fabricated pipes or tubes with flanges and fittings attached, for use in the conveyance of vapors, gases or liquids, regardless of whether the diameter is measured on the inside or the outside.

(b) *Nominal diameter.* The term "nominal diameter" as used in this part, means the commercial diameter of the piping.

(c) *Fitting.* The term "pipe fittings" refers to all hollow cylindrical fittings, and does not apply to flanges or valves.

§ 68.01–10 *Affidavit.* (a) When the manufacturers of steam and water pipes file with the Commandant a certificate duly sworn to that all such pipes manufactured by them will stand all the tests and meet all the applicable requirements of this chapter, they shall be accepted by inspectors of the Coast Guard.

(b) The manufacturer of valves and fittings shall file with the Commandant a certificate duly sworn to that all valves and fittings furnished by him for use on steam vessels comply with the requirements of this subchapter.

(c) After July 1, 1911, the Officer in Charge, Marine Inspection, shall refuse to allow the use of any valves or fittings on steam vessels until notified by the Commandant that such certificate is on file in his office. This shall not apply to valves and fittings installed previous to July 1, 1911.

SUBPART 68.05—DETAIL REQUIREMENTS

§ 68.05–1 *Material.* (a) Welded steam and water pipes may be permitted for pipe diameters from ⅛ inch inside diameter up to and including 30 inches inside diameter. The pipe shall be made of wrought iron or mild steel, smooth, straight, and free from defects. Threaded pipe of standard thickness shall be avoided as far as possible. In steam pipes it is a very serious matter and shall not be allowed in any case on standard pipe over 5 inches in diameter. All pipe over 2 inches in diameter shall be lap-welded.

(b) Cast-steel fittings of any size or character and for any pressure and for any temperature may be used for any and all steam and feed-pipe connections, and for valves, cocks, and all appliances subject to steam or water pressure, when made by regular processes and by manufacturers who stamp such fittings and appliances with their trade-mark or identifying stamp and who guarantee the castings to possess the following physical characteristics: Tensile strength, minimum, 50,000; maximum, 78,000 pounds per square inch; elastic limit, minimum, not less than 45 percent of tensile strength; elongation in 2 inches, minimum, 25 percent. There shall be taken from each heat an annealed coupon or coupons, for the purpose of determining the physical tests, and the manufacturers shall furnish coupons to the Officer in Charge, Marine Inspection, for tests when so required. All steel castings shall be thoroughly annealed.

(c) Cast iron, semisteel, or ferrosteel, possessing a tensile strength of not less than 22,000 pounds to the sectional square inch, may be used in the construction of valves and fittings for pressures not exceeding 300 pounds when such valves and fittings of 3 inches diameter or over are stamped with the trade-mark or identifying stamp of the manufacturer.

(d) Malleable iron possessing a tensile strength of not less than 30,000 pounds to the sectional square inch may be used in the construction of valves and fittings up to and including 6 inches in diameter, and for pressures not exceeding 300 pounds. Such valves and fittings of 3 inches diameter or over shall be extra heavy, the fitting beaded or banded, and the valves and fittings stamped with the trade-mark or identifying stamp of the manufacturer.

(e) Hard brass, bronze, and other compositions, of which 95 percent is copper, tin, and zinc, possessing a tensile strength of not less than 30,000 pounds to the square inch, may be used in the construction of all valves and fittings up to and including 12 inches in diameter. All such fittings of 3 inches in diameter or over shall be stamped with the trademark or identifying stamp of the manufacturer.

(f) The following material shall be permitted at the allowable temperatures indicated:

(1) Cast iron, malleable iron, semisteel, and ferrosteel may be used in connection with temperatures up to and including 450 degrees F.

(2) Hard brass, bronze, and other compositions, of which 95 percent is copper, tin, and zinc, may be used in connection with temperatures up to and including 470 degrees F., but this temperature may be increased to 550 degrees F. when the manufacturer of the valves or fittings stamps them with the temperature they are guaranteed to stand without disintegration. This paragraph will also apply to any composition meeting the above physical requirements and stamped in accordance therewith.

(3) For temperatures exceeding 550 degrees F. no valves or fittings other than steel or of a composition whose tensile strength has been demonstrated to exceed 50,000 pounds per sectional square inch with an elongation of 10 percent in a length of 2 inches shall be allowed. Such valves and fittings shall be stamped as above required.

§ 68.05–5 *Computations*—(a) *Steel and iron pipe.* (1) Thickness of and pressure allowed on main steam pipe constructed of riveted iron or steel plates that have been stamped and tested as required by R. S. 4430 (46 U. S. C. 408), shall be determined in the same manner as required by R. S. 4433 (46 U. S. C. 411), to determine the pressure allowable on boilers.

(2) The thickness of and maximum allowable pressure on all lapwelded or solid-drawn steam pipe of wrought iron

or steel shall be determined by the following formulas:

$$T=\frac{P\times D}{10{,}000}+0.125 \quad (1)$$

$$P=\frac{(T-0.125)\times 10{,}000}{D} \quad (2)$$

where:
P = maximum allowable pressure, in pounds per square inch.
T = thickness of pipe, in inches.
D = diameter of pipe, in inches.

(b) *Copper pipe.* (1) The thickness of copper pipe, according to the maximum allowable pressure, shall be determined by the following formulas:

$$T=\frac{P\times D}{8{,}000}+0.0625 \quad (3)$$

where:
T = thickness, in inches.
P = maximum allowable pressure, in pounds per square inch.
D = inside diameter of pipe, in inches.

(2) All copper pipe subject to pressure and installed for use on steam vessels after July 1, 1911, shall have a thickness of material according to the maximum allowable pressure, to be determined by the following formula:

$$T=\frac{P\times D}{6{,}000}+0.0625 \quad (4)$$

where:
T = thickness, in inches.
P = maximum allowable pressure, in pounds per square inch.
D = inside diameter of pipe, in inches.

(c) *Steel fittings.* The minimum thickness of steel fittings shall be determined by the following formula:

$$T=\frac{P\times D}{7{,}000}+0.188 \quad (5)$$

where:
P = maximum allowable pressure, in pounds per square inch.
D = diameter, in inches.
T = thickness, in inches.

(d) *Cast iron fitting.* The minimum thickness of cast iron, semisteel, or ferrosteel fittings shall be determined by the following formula:

$$T=\frac{P\times D}{3{,}000}+0.25 \quad (6)$$

where:
T = thickness of casting, in inches.
P = maximum allowable pressure, in pounds per square inch.
D = internal diameter of the largest opening contained in the cylindrical part of the casting in inches.

(e) *Nonferrous slip joints.* (1) The wearing surface of the male pipe in all slip joints made after June 30, 1908, for use in steam pipes shall be made of copper or composition, and shall be of sufficient length and so adjusted as to prevent accidental withdrawal from the packing box. When made of composition, same shall be of not less than 95 percent copper, tin, and zinc, possessing a tensile strength of not less than 30,000 pounds to the square inch. It may be used for sizes up to and including 12 inches in diameter, and for all pressures not exceeding 300 pounds per square inch.

(2) The minimum thickness of such fittings shall be determined by the following formula:

$$T=\frac{P\times D}{4{,}000}+0.22 \quad (7)$$

where:
P = maximum allowable pressure, in pounds per square inch.
D = diameter, in inches.
T = thickness, in inches.

§ 68.05–10 *Valves and fittings.* (a) Valves and fittings of 3 inches and under may be connected by screw threads at their intermediate joints in pipe lines.

(b) Each and every valve for marine service shall have the trade-mark of the manufacturer cast or stamped on the chamber. All such valves of 2 inches diameter and over shall be subjected by the manufacturer before shipment to a hydrostatic pressure of three times the working pressure which the manufacturer guarantees them to stand without distorting, and shall also be stamped with such working pressure and also the letters "M. S." which shall plainly indicate that the valve has met the test requirements for marine service.

(c) All valves of over 2 inches diameter, without regard for the service for which they are intended, installed after April 30, 1917, shall have bolted bonnets.

(d) Screwed bonnets on cast-iron valves of any size and for any character of service are positively prohibited.

(e) All pipe fittings of more than 3 inches internal diameter shall be subjected by the manufacturer to a test of three times the pressure to which they will be subjected in service.

§ 68.05–13 *Joints and flanged connections*—(a) *Flanges and connections for wrought-iron and homogeneous-steel feed and steam pipe.* (1) The terminal and intermediate flanges of all wrought-iron and homogeneous-steel feed and steam pipe over 2 inches in diameter, other than on pipe or coil boilers of steam generators, shall be made of wrought iron, homogeneous steel, malleable iron having a tensile strength of not less than 30,000 pounds per square inch of section, or equivalent material.

(2) All such flanges shall have a depth through the bore of not less than one-half of the diameter of the pipe to which the flange is attached.

(3) The bore shall increase slightly toward the face of the flange, and the end of the pipe shall be enlarged to fit the bore of the flange and shall be substantially beaded over or outward into a recess in the face of the flange.

(4) Flanges on extra heavy lap-welded steam pipe up to and including 5 inches diameter may be attached with screw threads and the joints in bends may be made with extra heavy malleable-iron elbows or equivalent material.

(5) Feed and steam pipe up to and including 3 inches diameter may be connected at intermediate joints by being screwed into flanges or extra heavy fittings.

(6) Flanges of cast iron, semisteel, or ferrosteel, having a tensile strength of not less than 20,000 pounds per square inch of section, may be employed in connecting extra heavy lap-welded pipe by screw threads. Such flanges shall be extra heavy and have a depth through the bore of not less than the United States standard length of thread for the pipe to which the flange is attached plus depth of counterbore. The thickness of the flange, excluding hub, shall be not less than three-tenths of the diameter of the pipe plus 0.25 of an inch. The pipe shall fit snugly in the counterbore, which shall be not less than one-fourth the diameter of the pipe in depth.

(7) Flanges of wrought iron or steel grooved in the bore to a depth equal to the thickness of the material in the pipe shall be allowed for use on all steam and feed pipe when the end of the pipe has been thoroughly annealed and expanded into the flange by approved machinery.

(8) Flanges with hubs projecting not less than 1¾ inches from the back of the flange may be shrunk on lapwelded or riveted-iron or steel or seamless-drawn steel steam pipes over 5½ inches diameter where the pipe is brought to a true and parallel circle at the end and beaded over into a recess at the face of the flange, or flared to an angle of approximately 20 degrees or the bore of the flange may be tapered and the pipe expanded into the bore.

(9) Flanges of cast steel, wrought iron, or homogeneous steel, equal in strength to the pipe to which it is attached, may be riveted to the pipe. When pipe is used for steam lines where flanges are riveted on and calked, the ends of the pipe shall be properly annealed before drilling or riveting the flanges on.

(10) Flanges may be secured to pipe by expanding the pipe by proper and approved machinery and flaring the end of the pipe to an angle not exceeding 20 degrees, taken in the direction of the length of the pipe, and having a depth of flare equal to at least one and one-half times the thickness of the pipe.

(11) Flanges of cast steel, forged steel, or wrought iron may be used in any process of expanding the pipe into grooves in the bore of the flange and flaring the end of the pipe to an angle of 20 degrees.

(12) Flanges welded to lapwelded steam pipes of iron or steel may be used when the manufacturer furnishes an affidavit that the pipe has been properly annealed after all work requiring fire has been finished.

(13) All flange connections made by the process of expanding, welding, or shrinking shall be subjected to a hydrostatic test of twice the working pressure without showing signs of weakness.

(b) *Flanges on copper pipe.* (1) The flanges of all copper steam and feed pipe over 3 inches diameter shall be made of brass or bronze composition, forged-iron, or steel or open-hearth steel castings. The end of the pipe shall be flanged over or outward to a width of not less than twice the thickness of the pipe and to a radius of not more than the thickness of the pipe, and the flange securely brazed or riveted to the pipe. If the pipe is properly formed with a full reinforced taper through the flange, the riveting or brazing may be dispensed with. The thickness of flanges shall be not less than four times the required thickness of the pipe plus 0.25 of an inch.

(2) Any form of expanded, grooved, and flared joint will be allowed for copper pipe under the same regulations, restrictions, and tests applying to iron or steel pipe.

(3) All flange joints shall be fitted with such number of bolts or rivets as will make the joint equal in strength to all other parts of the pipe.

(4) Any form of joint which, in the judgment of the Officer in Charge, Marine Inspection, is equal in strength and efficiency to the flange connections required by this section shall be allowed on any and all classes of pipe.

§ 68.05–15 *Installation.* (a) Where vent and sounding pipes pass through cargo spaces they shall be protected against damage.

(b) No copper pipe constructed after June 30, 1905, shall have any bend whose radius is less than one and one-half times the diameter of the pipe and such pipe shall be so led and flanges so placed that they may be readily taken down if required. Such pipes shall be protected by iron casings when run through coal bunkers, and shall be clear of the coal chutes.

(c) All sea valves or cocks secured to the skin of the vessel by bolts and connected to the engines or boilers by pipes shall be arranged so as to be accessible at all times, so that if a leak or defect occurs it can be reached. All parts of said valves except the chamber shall be made of brass or bronze when used on wooden-hull vessels navigating salt water; but in the case of vessels of iron or steel the brass or bronze bolts may be dispensed with.

§ 63.05–20 *Fuel oil filling and transfer system*—(a) *Ocean and coastwise.* (1) The construction of fuel-oil tanks separate from the hull shall conform to the following requirements: Plating for such tanks shall be not less than 5/16 inch in thickness; seams where the plates are joined shall be double-riveted; all rivet holes shall be fairly drilled, or punched three-fourths diameter and reamed to size; rivet holes shall be spaced not to exceed four diameters; and, where practicable, the tanks shall be caulked inside and out.

(2) Where double bottoms are used for the storage of fuel oil, such double bottoms shall be subdivided with one or more longitudinal watertight bulkheads, except the narrow tanks at the forward and after ends of the vessel. This requirement shall also apply to fuel-oil deep tanks which shall also be fitted with the necessary swash plates. The hatch covers on deep tanks which are used for fuel oil shall be made of steel or iron plating and be fitted oiltight. Fuel-oil tanks in 'tween-deck spaces overhanging the boiler space or adjoining the ship's sides abreast of the boilers shall be avoided as far as practicable, but where found to be necessary, they shall be subdivided into compartments not exceeding 20 feet in length.

(3) The test for fuel-oil tanks that do not form a part of the structure of the hull shall be a hydrostatic test of 15 pounds to the square inch, and all other tanks shall be tested with a pressure that will not be exceeded in practice.

(4) Deep tanks, peak tanks, settling tanks, and tanks separate from the hull used for the storage of fuel oil shall be fitted with internal gate valves where the suction pipe or pipes penetrate the tank, the valves to be fitted with mechanical appliances so arranged that they may be operated from an accessible place on deck outside of the machinery space. Double-bottom fuel-oil tanks shall be fitted with a gate valve on the tank top where the suction pipe penetrates it, or, where the suction pipe leads under the tank tops, the valve shall be placed where the pipe enters the machinery space.

(b) *Great Lakes; lakes, bays, sounds, and rivers.* (1) The fuel-oil tanks on all inland steamers subject to the requirements in this subchapter shall be constructed of material of such thickness and workmanship as, in the judgment of the inspector where the installation is made, is safe.

(2) All pipe connections on fuel-oil tanks and cargo-oil tanks, except the connection or connections on the top of such tank, shall be protected by an internal gate valve operated by an extension rod leading to an accessible point in an open space on a deck outside the engine and fireroom casing, so that the flow of oil may be immediately shut off in the case of failure or rupture of any of the pipes or connections.

(c) No openings are to be cut in the bottoms, ends, or sides of fuel-oil tanks except for suction and heater connections.

(d) All pipes over 2 inches in diameter shall be attached to fuel-oil tanks by flanges, or flanged fittings, riveted to the tanks. Filling pipes for such tanks shall extend through the top of the tank to deck, and such pipes shall be led to the bottoms of the tanks and fitted with U-bends extending upward at least 12 inches above the bottoms; or in lieu of the U-bends the pipes may be led to within one-half of the diameter of the pipes from the bottom of the tanks.

§ 68.05–25 *Fuel-oil service systems.* (a) The piping between the service pumps and the stop valve at the burners, when the pressure exceeds 15 pounds per square inch, shall be extra-heavy seamless piping and shall be in sight above the floor or platform. The connections on such piping shall be made with extra-heavy flanges or extra-heavy fittings of forged or cast steel, bronze, or malleable iron. Valves on pipe lines conveying hot oil shall be extra heavy and shall be of the locked-bonnet, bolted-bonnet, or union-nut-bonnet type.

(b) The piping, including connections, shall be tested in place to a hydrostatic test pressure equal to three times the designed maximum working pressure, but in no case less than 150 pounds. All other piping for use in conveying fuel oil, together with valves, and fittings, shall be suitable for a pressure of 125 pounds and all such pipe and fittings between the gate valve within the tank and the pumps shall be tested to a hydrostatic pressure of 250 pounds.

(c) When it is desired to change a low-pressure system to a high-pressure system, it will be necessary to apply a hydrostatic test pressure to the piping and connections from pumps to burners equal to three times the working pressure.

(d) All oil heaters shall be tested to double the working pressure. Continuous pipe or pipes shall be carried through the heads or ends of the heaters, and all joints shall be made on the outside to eliminate the danger of oil being pumped into the boilers in the event of failure of the joints: *Provided,* That this requirement does not apply when the water of condensation from the heaters is led to an observation tank or is not used for boiler-feed water. Heaters may be installed in double-bottoms, if so desired, when vessels are operating in cold waters and may be placed in the most convenient location for heating the oil.

(e) Fuel-oil pumps supplying oil to the burners, also oil strainers, shall be in duplicate, and the discharge of each pump shall be fitted with an efficient relief valve that will return surplus oil to the suction side of the pumps.

(f) Throttle valves on fuel-oil pumps shall be arranged so that they may be operated from some accessible point outside of the pump-room or fireroom inclosure.

§ 68.05–30 *Vent piping.* (a) The vent pipes from all fuel-oil tanks shall have a net cross-sectional area equal to that of the filling pipes and shall be led from the top of the tank to the open air in a space where no danger will result from the discharge of oil vapor; the discharge ends to be fitted with U-bends and a gauze diaphragm, which can be easily removed for cleaning.

(b) Where it is necessary to use bends in the piping, such bends shall not exceed 45 degrees from the vertical.

§ 68.05–35 *Sounding pipes.* (a) Sounding pipes or other reliable apparatus shall be fitted to fuel tanks for use in determining the oil level in each tank. Sounding pipes shall be led up through the deck and down to within one diameter of the bottom of the tank, and shall not be perforated.

(b) Sounding pipes in the machinery spaces that do not extend up through a deck shall be fitted with a valve or stopcock that will close automatically to prevent oil overflow.

§ 68.05–40 *Welded piping.* (a) Fusion butt welding may be used to join bilge, ballast, fuel-oil overflow, fuel-oil transfer and vent pipes, fire and flushing mains, fresh water distribution, brine piping, and drain suctions from fuel-oil tanks.

(b) Heating coils in fuel-oil tanks may also be joined by fusion welding, provided butt welds are used and the welds protected by a sleeve, fillet welded at the ends of the wall of the pipe.

(c) In all cases, such welding shall comply with the requirements of Subchapter F (Marine Engineering) of this chapter.

PART 69—INSTALLATIONS, TESTS, INSPECTIONS, AND REPAIRS

Chapter I is amended by adding a new Part 69 to Subchapter G reading as follows:

SUBPART 69.01—INSTALLATIONS

Sec.
69.01–1 Protection of adjacent structure.
69.01–5 Dampers.

SUBPART 69.05—TESTS AND INSPECTIONS

69.05–1 Test and inspection of new boilers.
69.05–5 Name plates.
69.05–10 Tests and inspection of boilers and main steam piping in service.
69.05–15 Donkey boilers.
69.05–20 Inspection of foreign-built boilers admitted to American Registry.
69.05–25 Inspection of boilers on existing barges.

SUBPART 69.10—REPAIRS

69.10–1 Welding repairs.

AUTHORITY: §§ 69.01–1 to 69.10–1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. R. 4399, 4400, 4417, 4417a, 4418, 4421, 4426–4430, 4433, 4434, 4453, 4491, as amended, sec. 14, 29 Stat. 600, 41 Stat. 305, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 391a, 392, 399, 404–408, 411, 412, 435, 489, 366, 363, 367, 463a, 1333, 50 U. S. C. 1275, 1275.

SUBPART 69.01—INSTALLATIONS

§ 69.01–1 *Protection of adjacent structure.* (a) Externally heated boilers shall have a clear space between the boiler and the woodwork of not less than 6 inches at the sides and 4 inches at the top.

(b) Internally heated boilers shall have a clear space between the boiler and the woodwork of not less than 4 inches at the sides and 4 inches at the top.

(c) All woodwork or other ignitible substance approaching within 12 inches of the boiler or smokestack (unless such boiler or smokestack is covered with good nonconducting material) shall be suitably sheathed with metal over noncombustible material and all woodwork or other ignitible substance in or around the fireroom shall be properly protected by metal or asbestos sheathing.

(d) All boilers hereafter placed in wooden steamers shall have a clear space of at least 8 inches between the underside of the cylindrical shell and the floor or keelson; and on all other steamers the boilers shall be so placed as to permit of proper inspection of the underside thereof.

(e) All water-tube or coil boilers shall have a clear space of not less than 4 inches between the back end of boiler and bulkhead. All other boilers shall have a clear space of not less than 2 feet between the back end of boiler and bulkhead.

(f) Where fuel-oil tanks are fitted in wooden vessels, lead pans or lining shall be placed under the tanks, the lead to be of a gage weighing not less than 8 pounds per square foot, this precaution being made to prevent oil from getting into the bilges of the vessel.

(g) Suitable drip pans shall be installed to catch the drip from burners, fuel-oil pumps, strainers, or any other place where necessary to prevent oil from reaching the bilges of the vessel.

(h) The boiler room and funnel casings shall be insulated so as to prevent the spread of fire to woodwork or other combustible material adjacent to the casings in the event of an oil fire taking place in the fireroom.

§ 69.01–5 *Dampers.* (a) Dampers in funnels or uptakes on oil-burning steamers shall be fitted with a locking device in open position.

SUBPART 69.05—TESTS AND INSPECTIONS

§ 69.05–1 *Test and inspection of new boilers.* (a) All coil and pipe hereafter made, when such boiler is completed and ready for inspection, shall be subjected at the first inspection to a hydrostatic pressure at a ratio of 150 pounds to a steam pressure of 100 pounds.

§ 69.05–5 *Name plates.* (a) There shall be fastened to each boiler a plate containing the name of the manufacturer of the material, the place where manufactured, the tensile strength, the name of the builder of the boiler, when and where built.

(b) The date of the building of the boiler or boilers shall be determined by the month and year of issue of the first certificate of inspection which covers the boiler or boilers in question: *Provided,* That the boiler or boilers have not been used for any purpose previous to the inspection.

§ 69.05–10 *Tests and inspection of boilers and main steam piping in service.* (a) The hydrostatic pressure applied to boilers which can be satisfactorily examined internally shall be in the proportion of 125 pounds to the square inch to 100 pounds to the square inch of the steam pressure allowed; types of boilers which due to design cannot be examined internally shall be subjected to a hydrostatic pressure in the proportion of 150 pounds to the square inch to 100 pounds to the square inch of the steam pressure allowed. The inspector, after applying the hydrostatic test, shall thoroughly examine every part of the boiler. The hydrostatic pressure shall also be applied to the main steam pipe up to the throttle.

(b) In the application of the hydrostatic pressure to boilers, inspectors shall require such arrangements as will guard against main and auxiliary stop valves being subjected to hydrostatic pressure on one side at the same time that steam pressure is exerted on the opposite side.

(c) Steamers on going out of service or laying up in winter quarters and beginning the annual inspection may have the hydrostatic pressure applied to boilers at any time preceding the date of the final completion of the inspection, so that, however, in no instance shall the vessel be navigated to exceed 12 months without the hydrostatic pressure.

(d) Inspectors are required at each annual inspection to carefully inspect the flues of every boiler and subject them to the hammer test where possible or practicable in order that deterioration of material may be detected. If such test indicates thin material, the doubtful place shall be drilled and the material carefully gaged in order that the safe pressure may be determined; or if the flue is found to deviate from the form of a practically true circle, the pressure shall be reduced accordingly. The efficiency and workmanship of the riveted seams shall also be carefully observed at all inspections.

(e) The Officer in Charge, Marine Inspection, in determining the distance between the flues and the shells of externally fired boilers, under provisions of R. S. 4434 (46 U. S. C. 412), shall take the measurements from the plate in the flue to the plate in the shell on vessels in river service only.

(f) The shell of any boiler which has reached the age of 10 years shall, at the first annual inspection thereafter, and at such subsequent periods as the Officer in Charge, Marine Inspection, or Coast Guard District Commander may deem necessary, be drilled near the water line and at such other points in the shell as may be necessary to determine as nearly as possible the thickness of material, which ascertained thickness, together with the general condition of the boiler, shall govern the maximum allowable pressure. If the thickness found by actual measurement is less than the original thickness, the maximum allowable pressure shall be recalculated using the thinnest portion of the shell plate as the thickness of the shell, and shall not exceed the maximum pressure permitted by the applicable boiler design formulas. For the purpose of such recalculation, the design formulas specified in this subchapter may be used for boilers made or contracted for prior to July 1, 1935, or alternatively the design formulas set forth in Subchapter F (Marine Engineering) may be used.

§ 69.05–15 *Donkey boilers.* Donkey boilers shall be inspected in the same manner as the main boilers.

§ 69.05–20 *Inspection of foreign-built boilers admitted to American Registry.* (a) Boilers of foreign-built vessels admitted to American registry shall be inspected in the same manner as boilers on American vessels.

(b) The working steam pressure shall be determined by the application of the hydrostatic pressure in the ratio as required by the laws of the United States and by a close observation of the general condition of the boiler.

(c) The working steam pressure under which the boilers are being operated shall be accepted as the basis for determining the allowable working pressure where it is not practicable or possible to secure a record of the tests of the plates entering into the construction of the boiler.

§ 69.05–25 *Inspection of boilers on existing barges.* Boilers on existing barges required to be inspected and not constructed according to the specifications prescribed by the Commandant may be considered the same as foreign-built boilers as specified in § 69.05–20, and so treated.

SUBPART 69.10—REPAIRS

§ 69.10–1 *Welding repairs.* (a) No repair work by any welding process other than fusion welding shall be allowed on main boilers or unfired pressure vessels until coupons showing the character of the work proposed to be done by the applicant shall have been tested and submitted, with an explanation and report

of the test, to the Officer in Charge, Marine Inspection, at or nearest the place where the work is to be done. The Officer in Charge, Marine Inspection, shall then satisfy himself whether or not such process can be used with safety on the boilers or unfired pressure vessels of steam vessels.

(b) In every case where repairs are to be made by these processes on boilers or unfired pressure vessels of steam vessels subject to the inspection of the Coast Guard, the engineer in charge and the parties making the repairs are required to notify the Officer in Charge, Marine Inspection, giving full detailed description of the repairs to be made, the location of the vessel, and the time the repairs are to be begun, so that inspection may be had, if practicable, prior to and during the time the work is being done, which reports must be confirmed in writing to the Officer in Charge, Marine Inspection.

(c) The application for permission to use these processes on boiler or unfired pressure vessel repairs of any particular vessel implies a guaranty on the part of the applicant that the work shall, in material, flux, and workmanship, be equal to that of the samples furnished.

(d) Repairs to marine boilers and unfired pressure vessels by means of fusion welding may be permitted provided such welding conforms to the requirements of Subchapter F (Marine Engineering) of this chapter.

Chapter H—Passenger Vessels

The title for Subchapter H is changed from "General Rules and Regulations; Great Lakes" to "Passenger Vessels," and Chapter I is amended by adding a new Part 70 to Subchapter H reading as follows:

PART 70—GENERAL PROVISIONS

SUBPART 70.01—AUTHORITY AND PURPOSE

Sec.

70.01–1 Purpose of regulations.
70.01–5 Assignment of functions.
70.01–10 Authority for regulations.

SUBPART 70.05—APPLICATION

70.05–1 Vessels subject to the requirements of this subchapter.
70.05–5 Specific application noted in text.

SUBPART 70.10—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

70.10–1 Approved.
70.10–3 Carrying passengers for hire.
70.10–5 Carrying freight for hire.
70.10–7 Classed vessel.
70.10–9 Commandant.
70.10–11 Coast Guard District Commander.
70.10–13 Coastwise.
70.10–15 Ferry.
70.10–17 Great Lakes.
70.10–19 Headquarters.
70.10–21 International voyage.
70.10–23 Lakes, bays, and sounds.
70.10–25 Marine inspector or inspector.
70.10–27 Motorboat.
70.10–29 Motor vessel.
70.10–31 Ocean.
70.10–33 Officer in charge, Marine Inspection.
70.10–35 Passenger.
70.10–37 Pilot rules.
70.10–39 Rivers.
70.10–41 Recognized classification society.
70.10–43 Short international voyage.
70.10–45 Vessel.
70.10–47 Western rivers.

SUBPART 70.15—EQUIVALENTS

Sec.

70.15–1 Conditions under which equivalents may be used.

SUBPART 70.20—GENERAL MARINE ENGINEERING REQUIREMENTS

70.20–1 Marine engineering details.

SUBPART 70.25—GENERAL ELECTRICAL ENGINEERING REQUIREMENTS

70.25–1 Electrical engineering details.

SUBPART 70.30—SPECIAL PROVISIONS

70.30–1 Vessels acquired or documented under the act of June 6, 1941.
70.30–5 Installations of equipment made during the unlimited national emergency declared by the President on May 27, 1941.

SUBPART 70.35—AMERICAN BUREAU OF SHIPPING'S STANDARDS

70.35–1 Standards to be used.
70.35–5 Where obtainable.

AUTHORITY: §§ 70.01–1 to 70.35–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4426, as amended, sec. 5, 49 Stat. 1384, as amended, secs. 1, 2, 49 Stat. 1544, as amended, sec. 17, 54 Stat. 166, as amended, sec. 3, 54 Stat. 346, as amended, sec. 2, 54 Stat. 1028, as amended, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 404, 369, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 70.01—AUTHORITY AND PURPOSE

§ 70.01–1 *Purpose of regulations.* (a) The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for passenger vessels in accordance with the intent of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various International Conventions for Safety of Life at Sea and other treaties which affect the merchant marine. The regulations are necessary to carry out the provisions of law affecting passenger vessels and such regulations have the force of law.

§ 70.01–5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950 (15 F. R. 4935, 5 U. S. C. Note under 241), effective July 31, 1950, the functions formerly vested in the Commandant, United States Coast Guard, were transferred to the Secretary of the Treasury with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 70.01–10 *Authority for regulations.* (a) *General.* The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375 and 416), as well as in other provisions of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) *Inspection and certification.* (1) The regulations regarding inspection and certification of passenger vessels interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4423, 4426, 4428–4430, 4433, 4434, and 4453, as amended, sec. 14, 29 Stat. 690, secs. 10 and 11, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1544, 1935, sec. 3, 54 Stat. 346, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 361, 362, 391, 392, 399, 400, 404, 406–408, 411, 412, 435, 366, 395, 396, 363, 367, 660a, 1333, and 50 U. S. C. App. 1275).

(c) *Construction and arrangement.* (1) The regulations regarding the construction and arrangement of passenger vessels interpret or apply R. S. 4417, 4418, 4426, and 4490, as amended, sec. 3, 24 Stat. 129, 41 Stat. 305, sec. 5, 49 Stat. 1384, secs. 1 and 2, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 482, 483, 363, 369, 367, 1333, 463a and 50 U. S. C. App. 1275).

(d) *Subdivision.* (1) The regulations regarding subdivision of passenger vessels interpret or apply R. S. 4417, 4418, 4426, and 4490, as amended, sec. 3, 24 Stat. 129, 41 Stat. 305, sec. 2, 45 Stat. 1493, sec. 2, 49 Stat. 888, sec. 5, 49 Stat. 1384, secs. 1 and 2, 49 Stat. 1544, sec. 3, 54 Stat. 346, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 482, 483, 363, 85a, 88a, 369, 367, 1333, and 50 U. S. C. App. 1275).

(e) *Stability.* (1) The regulations regarding stability of passenger vessels interpret or apply R. S. 4417, 4418, 4426, and 4490, as amended, sec. 3, 24 Stat. 129, 41 Stat. 305, sec. 2, 45 Stat. 1493, sec. 2, 49 Stat. 888, sec. 5, 49 Stat. 1384, secs. 1 and 2, 49 Stat. 1544, sec. 3, 54 Stat. 346, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 482, 483, 363, 85a, 88a, 369, 367, 1333, and 50 U. S. C. App. 1275).

(f) *Lifesaving equipment.* (1) The regulations regarding lifesaving equipment of passenger vessels interpret or apply R. S. 4417, 4418, 4426, 4481, 4482, 4488, and 4491, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 474, 475, 481, 489, 367, 526p, 1333, and 50 U. S. C. App. 1275).

(g) *Fire protection equipment.* (1) The regulations regarding fire protection equipment of passenger vessels interpret or apply R. S. 4417, 4418, 4426, 4470, 4471, 4477, 4479, and 4483, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 463, 464, 470, 472, 476, 367, 526p, 1333, 463a, and 50 U. S. C. App. 1275).

(h) *Vessel control and miscellaneous systems and equipment.* (1) The regulations regarding vessel control and miscellaneous systems and equipment of passenger vessels interpret or apply R. S. 4417, 4418, and 4426, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, and sec. 5, 55 Stat. 244, 245 (46 U. S. C. 391, 392, 404, 367, 526p, 1333, and 50 U. S. C. App. 1275).

(i) *Operations.* (1) The regulations regarding operations of passenger vessels interpret or apply R. S. 4417, 4418, 4426, and 4453, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 435, 367, 526p, 1333, and 50 U. S. C. App. 1275).

SUBPART 70.05—APPLICATION

§ 70.05–1 *Vessels subject to the requirements of this subchapter.* (a) This subchapter shall be applicable to all vessels indicated in column 4 of Table 70.05–1 (a) and shall apply to all such United States flag vessels, and to all such foreign vessels which carry more than 12 passengers from any port in the United States to the extent prescribed by law, except as follows:

(1) Any vessel of a foreign nation signatory to the International Convention for the Safety of Life at Sea, 1948, and which has on board a current, valid safety certificate.

(2) Any vessel of a foreign nation having inspection laws approximating those of the United States together with reciprocal inspection arrangements with the United States, and which has on board a current, valid certificate of inspection issued by its government under such arrangements.

(3) Any vessel operating exclusively on inland waters which are not navigable waters of the United States.

(4) Any vessel while laid up and dismantled and out of commission.

(5) With the exception of vessels of the U. S. Maritime Administration, any vessel with title vested in the United States and which is used for public purposes.

§ 70.05–5 *Specific application noted in text.* (a) At the beginning of the various parts, subparts, and sections, a more specific application is generally given for the particular portion of the text involved. This application sets forth the types, sizes, or services or vessels to which the text pertains, and in many cases limits the application of the text to vessels contracted for before or after a specific date. As used in this subchapter, the term "vessels contracted for" includes not only the contracting for the construction of a vessel, but also the contracting for a material alteration to a vessel, the contracting for the conversion of a vessel to a passenger vessel, and the changing of service or route of a vessel if such change increases or modifies the general requirements for the vessel or increases the hazards to which it might be subjected.

TABLE 70.05–1 (a)

Method of propulsion	Size or other limitations	Classes of vessels (including motorboats) examined or inspected under various Coast Guard regulations			
		Vessels inspected and certificated under Subchapter D—Tank Vessels [1]	Vessels inspected and certificated under Subchapter H—Passenger Vessels [1 2]	Vessels inspected and certificated under Subchapter I—Cargo and Miscellaneous Vessels [1 2]	Vessels subject to provisions of Subchapter C—Uninspected Vessels [1 2 3]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Steam	Vessels 40 feet in length and under.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tug boats and tow boats.	All vessels except those covered by Subchapters D and I.
	Vessels over 40 but not over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tug boats and tow boats.	All vessels except those covered by Subchapters D and I.[5]
	Vessels over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew. 3. Towing and fishing vessels, in other than ocean and coastwise service, issued a permit to carry persons on the legitimate business of the vessel, in addition to the crew, but not to exceed one for each net ton of the vessel.	All vessels except those covered by Subchapters D and H.	None.
Motor	Vessels of not over 15 gross tons.	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	None	All vessels except those covered by Subchapter D.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers for hire except documented cargo vessels over 65 feet in length issued a permit to carry not more than 16 persons in addition to the crew.	All vessels carrying freight for hire except those covered by Subchapters D and H.	All vessels except those covered by Subchapters D, H, and I.
	Seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew.	All vessels except those covered by Subchapters D and H, and those engaged in the fishing, oystering, clamming, crabbing or any other branch of the fishery, kelp, or sponge industry.	All vessels except those covered by Subchapters D, H, and I.
Sail		All vessels carrying combustible or inflammable liquid cargo in bulk.	All vessels over 700 gross tons carrying passengers for hire.	None	None.
Non-self-propelled	Inland barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges over 100 gross tons carrying passengers for hire.	None	All barges carrying passengers except those covered by Subchapter H.
	Seagoing barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges 100 gross tons and over carrying passengers.	All barges 100 gross tons and over except those covered by Subchapters D and H.	All barges carrying passengers except those covered by subchapter H.

[1] Subchapters E (Load Lines), F (Marine Engineering), and J (Electrical Engineering) of this chapter are also applicable under certain conditions.

[2] Public nautical school ships, other than vessels of the Navy and Coast Guard, shall meet the requirements of Part 167 of Subchapter R (Nautical Schools) of this chapter. Civilian nautical school ships, as defined by 46 U. S. C. 1331, shall meet the requirements of Subchapter H (Passenger Vessels) and Part 168 of Subchapter R (Nautical Schools) of this chapter.

[3] Any vessel on an international voyage is subject to the applicable requirements of the International Convention for the Safety of Life at Sea, 1948.

[4] Length measured from end to end over deck, excluding sheer.

[5] Boilers and machinery are subject to examination.

[6] Vessels covered by Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter, where the principal purpose or use of the vessel is not for the carriage of liquid cargo, may be granted a permit to carry a limited amount of combustible liquid cargo in bulk. The portion of the vessel used for the carriage of the combustible liquid cargo shall meet the requirements of Subchapter D (Tank Vessels) in addition to the requirements of Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter.

SUBPART 70.10—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

§ 70.10–1 *Approved.* This term means approved by the Commandant unless otherwise stated.

§ 70.10–3 *Carrying passengers for hire.* The carriage of any person or persons by a vessel for a valuable consideration, whether directly or indirectly flowing to the owner, charterer, operator, agent or any other person interested in the vessel.

§ 70.10–5 *Carrying freight for hire.* The carriage of any goods, wares, or merchandise or any other freight for a valuable consideration whether directly or indirectly flowing to the owner, charterer, operator, agent, or any other person interested in the vessel.

§ 70.10–7 *Classed vessel.* This term means any vessel classed by the American Bureau of Shipping or other recognized classification society.

§ 70.10–9 *Commandant.* This term means the Commandant of the Coast Guard.

§ 70.10–11 *Coast Guard District Commander.* This term means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within his district, which include the inspection, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 70.10–13 *Coastwise.* Under the designation shall be included all vessels normally navigating the waters of any ocean or the Gulf of Mexico 20 nautical miles or less offshore.

§ 70.10–15 *Ferry.* Under this designation shall be included those vessels, in other than ocean or coastwise service, having provisions only for deck passengers and vehicles, operating on a short run on a frequent schedule between 2 points over the most direct water route, and offering a public service of a type normally attributed to a bridge or tunnel.

§ 70.10–17 *Great Lakes.* Under this designation shall be included all vessels navigating the Great Lakes.

§ 70.10–19 *Headquarters.* This term means the Office of the Commandant, United States Coast Guard; Washington, D. C.

§ 70.10–21 *International voyage.* An international voyage as applied to United States vessels includes voyages between United States ports and ports outside the United States as well as between United States Continental ports and ports in the Territory of Alaska, Commonwealth of Puerto Rico, Territory of Hawaii, the Panama Canal Zone, or any other separate portion of the United States constituting a possession or held under a protectorate or mandate. However, vessels solely navigating the Great Lakes and their connecting and tributary waters as far east as the exit of the Lachine Canal at Montreal, in the province of Quebec, Canada, shall not be considered as on an international voyage for the purpose of the regulations contained in this subchapter.

§ 70.10–23 *Lakes, bays, and sounds.* Under this designation shall be included all vessels navigating the waters of any of the lakes, bays, or sounds other than the waters of the Great Lakes.

§ 70.10–25 *Marine inspector or inspector.* These terms mean any person from the civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspection, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 70.10–27 *Motorboat.* This term means any vessel indicated in column 4 of Table 70.05–1 (a), 65 feet in length or less which is propelled by machinery (including steam). The length shall be measured from end to end over the deck excluding sheer. This term includes a boat temporarily or permanently equipped with a detachable motor and any such boat when so propelled is subject to the applicable provisions of the Motorboat Act of April 25, 1940, as amended (secs. 1 to 21, 54 Stat. 163–167, 46 U. S. C. 526–526t), and the regulations promulgated thereunder. For the purpose of this subchapter, motorboats are included under the term "vessel" unless specifically noted otherwise. The various classes of motorboats are as follows:

Class A—Any motorboat less than 16 feet in length.
Class 1—Any motorboat 16 feet or over and less than 26 feet in length.
Class 2—Any motorboat 26 feet or over and less than 40 feet in length.
Class 3—Any motorboat 40 feet or over and not more than 65 feet in length.

§ 70.10–29 *Motor vessel.* This term means any vessel more than 65 feet in length, which is propelled by machinery other than steam.

§ 70.10–31 *Ocean.* Under this designation shall be included all vessels navigating the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore.

§ 70.10–33 *Officer in Charge, Marine Inspection.* This term means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who, under the superintendence and direction of the Coast Guard District Commander, is in charge of an inspection zone for the performance of duties with respect to the inspections, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 70.10–35 *Passenger.* A passenger is every person other than the master and the members of the crew or other persons employed or engaged in any capacity on board a vessel in the business of that vessel. In the case of a vessel on an international voyage a child under one year of age is not counted as a passenger.

§ 70.10–37 *Pilot rules.* (a) The term "pilot rules" means the statutory rules of the road and the implementing regulations of the Commandant. The regulatory pilot rules are contained in 33 CFR Parts 80, 82, 84, 90, 92, 95, and 100.

(b) In accordance with law, the Coast Guard publishes the statutory rules of the road and regulatory pilot rules in pamphlet form as follows:

(1) Rules to Prevent Collisions of Vessels and Pilot Rules for Certain Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico (CG 169).

(2) Pilot Rules for the Great Lakes and Their Connecting and Tributary Waters and the St. Marys River (CG 172).

(3) Pilot Rules for the Western Rivers and the Red River of the North (CG 184).

§ 70.10–39 *Rivers.* Under this designation shall be included all vessels whose navigation is restricted to rivers and/or canals exclusively, and to such other waters as may be so designated by the Coast Guard District Commanders.

§ 70.10–41 *Recognized classification society.* The term "recognized classification society" means the American Bureau of Shipping or other classification society recognized by the Commandant.

§ 70.10–43 *Short international voyage.* For the purpose of this subchapter, the expression "short international voyage" means an international voyage in the course of which a vessel is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety, and which does not exceed 600 miles in length between the last port of call in the country in which the voyage begins and the final port of destination.

§ 70.10–45 *Vessel.* Where the word "vessel" is used in this subchapter, it shall be considered to include all vessels indicated in column 4 of Table 70.05–1 (a), except as otherwise noted in this subpart.

§ 70.10–47 *Western rivers.* For the purpose of this subchapter, the term "western rivers" is as defined in CG 184, Pilot Rules for Western Rivers and the Red River of the North.

SUBPART 70.15—EQUIVALENTS

§ 70.15–1 *Conditions under which equivalents may be used.* (a) Where in this subchapter it is provided that a particular fitting, appliance, apparatus, or equipment, or type thereof, shall be fitted or carried in a vessel, or that any particular arrangement shall be adopted, the Commandant may accept in substitution therefor any other fitting, apparatus, or equipment, or type thereof, or any other arrangement: *Provided,* That he shall have been satisfied by suitable trials that the fitting, appliance, apparatus, or equipment, or type thereof, or the arrangement shall be at least as effective as that specified in this subchapter.

(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment, apparatus, or arrangement not specifically required by law is unreasonable or impracticable, the Commandant may permit the use of alternate equipment, apparatus, or arrangement to such an extent and upon such conditions as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subchapter.

SUBPART 70.20—GENERAL MARINE ENGINEERING REQUIREMENTS

§ 70.20–1 *Marine engineering details.* All marine engineering details such as piping, valves, fittings, boilers, pressure vessels, etc., and their appurtenances installed on the vessel, shall be designed, constructed, and installed in accordance with the provisions of Subchapter F (Marine Engineering) of this chapter.

SUBPART 70.25—GENERAL ELECTRICAL ENGINEERING REQUIREMENTS

§ 70.25–1 *Electrical engineering details.* All electrical engineering details and installations shall be designed and installed in accordance with Subchapter J (Electrical Engineering) of this chapter.

SUBPART 70.30—SPECIAL PROVISIONS

§ 70.30–1 *Vessels acquired or documented under the Act of June 6, 1941.* (a) Vessels acquired or documented under the act of June 6, 1941, as amended (sec. 5, 55 Stat. 244, 245, 50 U. S. C. App. 1275), shall be subject to the applicable provisions of Title 52 of the Revised Statutes, acts amendatory thereof or supplemental thereto and the rules and regulations thereunder.

(b) Unapproved lifesaving, fire fighting, and other equipment may be continued in service as long as, in the opinion of the Officer in Charge, Marine Inspection, such equipment is in good and serviceable condition. All replacements shall be in accordance with Coast Guard requirements.

§ 70.30–5 *Installations of equipment made during the unlimited national emergency declared by the President on May 27, 1941.* (a) Boilers, pressure vessels, machinery, piping, electrical, and other installations, including lifesaving, fire fighting, and other safety equipment, installed on vessels during the Unlimited National Emergency declared by the President on May 27, 1941, and prior to the determination of Title V of the Second War Powers Act, as extended (sec. 501, 56 Stat. 180, 50 App. Sup., 635), which do not fully meet the detailed requirements of the regulations in this chapter, may be continued in service if found to be satisfactory by the Commandant for the purpose intended.

SUBPART 70.35—AMERICAN BUREAU OF SHIPPING'S STANDARDS

§ 70.35–1 *Standards to be used.* (a) Where in this subchapter an item, or method of construction, or testing is required to meet the standards established by the American Bureau of Shipping, the current standards in effect at the time of construction of the vessel, or otherwise as applicable, shall be used. The current standards of other recognized classification societies may also be accepted upon approval by the Commandant.

§ 70.35–5 *Where obtainable.* (a) The standards established by the American Bureau of Shipping are usually published annually and may be purchased from the American Bureau of Shipping, 45 Broad Street, New York 4, New York. These standards may be also examined at the office of the Commandant (M), U. S. Coast Guard, Washington, D. C., or at the office of any Coast Guard District Commander or Officer in Charge, Marine Inspection.

PART 71—INSPECTION AND CERTIFICATION

Chapter I is amended by adding a new Part 71 to Subchapter H reading as follows:

SUBPART 71.01—CERTIFICATE OF INSPECTION

Sec.
71.01–1 When required.
71.01–5 Posting.
71.01–10 Period of validity.
71.01–15 Temporary certificate.
71.01–20 Expired certificate.

SUBPART 71.05—PERMIT TO PROCEED TO ANOTHER PORT FOR REPAIR

71.05–1 When issued.
71.05–5 To whom issued.
71.05–10 Conditions of permit.
71.05–15 Posting.

SUBPART 71.10—PERMIT TO ENGAGE IN EXCURSIONS

71.10–1 When issued.
71.10–5 To whom issued.
71.10–10 Conditions of permit.
71.10–15 Posting.

SUBPART 71.15—INSPECTION OF VESSELS

71.15–1 Standards in inspection of hulls, boilers, and machinery.

SUBPART 71.20—INITIAL INSPECTION

71.20–1 Prerequisite of certificate of inspection.
71.20–5 When made.
71.20–10 Plans.
71.20–15 Scope of inspections.
71.20–20 Specific tests and inspections.

SUBPART 71.25—ANNUAL INSPECTION

71.25–1 Prerequisite of certificate of inspection.
71.25–5 When made.
71.25–10 Scope of inspection.
71.25–15 Lifesaving equipment.
71.25–20 Fire detecting and extinguishing equipment.
71.25–25 Hull equipment.
71.25–30 Electrical engineering equipment.
71.25–35 Moving engineering equipment.
71.25–40 Sanitary inspection.
71.25–45 Fire hazards.
71.25–50 Inspector not limited.

SUBPART 71.30—REINSPECTION

71.30–1 When made.
71.30–5 Scope.
71.30–10 Inspector not limited.

SUBPART 71.35—SPECIAL SURVEYS OF UNCLASSED VESSELS

71.35–1 Special surveys required.
71.35–5 When due.
71.35–10 Marine engineering and electrical engineering requirements.
71.35–15 Inspector not limited.
71.35–20 Scope of Special Survey No. 1.
71.35–25 Scope of Special Survey No. 2.
71.35–30 Scope of Special Survey No. 3.
71.35–35 Scope of second and subsequent Special Surveys No. 1.
71.35–40 Scope of second and subsequent Special Surveys No. 2.
71.35–45 Scope of second and subsequent Special Surveys No. 3.

SUBPART 71.40—INSPECTION AFTER ACCIDENT

71.40–1 General or partial survey.

SUBPART 71.45—SANITARY INSPECTIONS

71.45–1 When made.

SUBPART 71.50—DRYDOCKING

71.50–1 When drydocked.
71.50–5 Notice by owner.

SUBPART 71.55—REPAIRS AND ALTERATIONS

71.55–1 Permission required.
71.55–5 Inspection required.

SUBPART 71.60—GAS FREEING

71.60–1 Inspection necessary.

SUBPART 71.65—PLAN APPROVAL

71.65–1 General.
71.65–5 Plans and specifications required for new construction.
71.65–10 Plans required for alterations of existing vessels.
71.65–15 Procedure for submittal of plans.
71.65–20 Number of plans required.

SUBPART 71.75—SAFETY CERTIFICATE

71.75–1 Required on international voyage.

AUTHORITY: §§ 71.01–1 to 71.75–1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4423, 4426, 4428–4430, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, secs. 10, 11, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1544, 1935, sec. 3, 54 Stat. 346, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 392, 399, 400, 404, 406–408, 411, 412, 435, 366, 395, 396, 363, 367, 660a, 1333, 50 U. S. C. App. 1275.

SUBPART 71.01—CERTIFICATE OF INSPECTION

§ 71.01–1 *When required.* (a) Except as noted in this subpart or Subpart 71.05, no vessel subject to inspection and certification shall be operated without a valid certificate of inspection.

§ 71.01–5 *Posting.* (a) On vessels of over 25 gross tons, the original certificate of inspection shall, in general, be framed under glass and posted in a conspicuous place where it will be most likely to be observed by the passengers. On vessels not over 25 gross tons, and on other vessels such as barges, where the framing of the certificate under glass would be impracticable, the original certificate of inspection shall be kept on board to be shown on demand.

§ 71.01–10 *Period of validity.* (a) Certificates of inspection will be issued for a period of one year. However, application may be made by the owner for inspection and issuance of a new certificate of inspection at any time within that year. The certificate of inspection may be revoked or suspended at any time.

§ 71.01–15 *Temporary certificate* (a) If necessary to prevent delay of the vessel, a temporary certificate of inspection, Form CG 854, shall be issued pending the issuance and delivery of the regular certificate of inspection. Such temporary certificate shall be carried in the same manner as the regular certifi-

cate and shall in all ways be considered the same as the regular certificate of inspection which it represents.

§ 71.01–20 *Expired certificate.* (a) Nothing in this subpart shall prevent a vessel upon a regularly established line from a port in the United States to a port of a foreign country not contiguous to the United States whose certificate of inspection expires at sea or while said vessel is in a foreign port or a port of Hawaii from lawfully completing her voyage without the valid certificate of inspection or temporary certificate required by this subpart: *Provided,* That the voyage shall be completed within 30 days after the expiration of the certificate of inspection. No such vessel shall depart if its certificate of inspection will expire within 15 days of the date of sailing.

SUBPART 71.05—PERMIT TO PROCEED TO ANOTHER PORT FOR REPAIR

§ 71.05–1 *When issued.* (a) The Officer in Charge, Marine Inspection, may issue a permit to proceed to another port for repair, Form CG 948, to a vessel, if in his judgment it can be done with safety, even if the certificate of inspection of the vessel has expired or is about to expire.

§ 71.05–5 *To whom issued.* (a) Such permit will only be issued upon the written application of the master, owner, or agent of the vessel.

§ 71.05–10 *Conditions of permit.* (a) The permit will state upon its face the conditions under which it is issued and whether or not the vessel is permitted to carry freight or passengers. Passengers may not be carried if the certificate of inspection has expired, except as provided under § 71.01–20.

§ 71.05–15 *Posting.* (a) The permit shall be carried in a manner similar to that described in § 71.01–5 for a certificate of inspection.

SUBPART 71.10—PERMIT TO ENGAGE IN EXCURSIONS

§ 71.10–1 *When issued.* (a) The Officer in Charge, Marine Inspection, may issue a permit to carry additional passengers on an excursion, Form CG–949, if after personally inspecting the vessel, it can, in his judgment, be done with safety.

§ 71.10–5 *To whom issued.* (a) Such permit will only be issued upon the written application of the master, owner, or agent of the vessel.

§ 71.10–10 *Conditions of permit.* (a) The permit will state upon its face the conditions under which it is issued, the number of extra passengers the vessel may carry, any additional lifesaving or safety equipment which will be required, the route for which the permit is granted, and the dates on which the permit will be valid.

§ 71.10–15 *Posting.* (a) The permit when used, shall be carried in addition to the certificate of inspection and shall be carried in a manner similar to that described in § 71.01–5 for a certificate of inspection.

SUBPART 71.15—INSPECTION OF VESSELS

§ 71.15–1 *Standards in inspection of hulls, boilers, and machinery.* (a) In the inspection of hulls, boilers, and machinery of vessels, the standards established by the American Bureau of Shipping, see Subpart 70.35 of this subchapter respecting material and inspection of hulls, boilers, and machinery, and the certificate of classification referring thereto, except where otherwise provided for by the rules and regulations in this subchapter, Subchapter E (Load Lines), Subchapter F (Marine Engineering), or Subchapter J (Electrical Engineering) of this chapter, shall be accepted as standard by the inspectors.

SUBPART 71.20—INITIAL INSPECTION

§ 71.20–1 *Prerequisite of certificate of inspection.* (a) The initial inspection is a prerequisite of the issuance of the original certificate of inspection.

§ 71.20–5 *When made.* (a) The original inspection will only be made upon the written application of the owner or builder of the vessel to the Officer in Charge, Marine Inspection, on Form CG 833, at or nearest the port where the vessel is located.

§ 71.20–10 *Plans.* (a) Before application for inspection is made and before construction is started, the owner or builder shall have plans indicating the proposed arrangement and construction of the vessel approved by the Commandant. The procedure for submitting plans and the list of plans to be supplied is set forth in Subpart 71.65.

§ 71.20–15 *Scope of inspections.* (a) The initial inspection, which may consist of a series of inspections during the construction of a vessel, shall include a complete inspection of the structure, machinery, and equipment, including the outside of the vessel's bottom and the outside and where possible the inside of the boilers. The inspection shall be such as to insure that the arrangements, materials, and scantlings of the structure, boilers and their appurtenances, piping, main and auxiliary machinery, electrical installations, lifesaving appliances, fire detecting and extinguishing equipment, and other equipment fully comply with the applicable regulations for such vessel and are in accordance with approved plans, and that the radio installation is in accordance with the requirements of the Federal Communications Commission. The inspection shall also be such as to insure that the workmanship of all parts of the vessel and its equipment is in all respects satisfactory.

§ 71.20–20 *Specific tests and inspections.* (a) The applicable tests and inspections relating to annual inspection as set forth in Subpart 71.25 shall be made at this time. In addition, the following specific tests and inspections shall be made by the inspector:

(1) Installation of lifeboats, davits, and winches, see Subpart 75.35 of this subchapter.

(2) Installation of carbon dioxide extinguishing piping, see § 76.15–15 of this subchapter.

(3) For inspection procedures of marine engineering equipment and systems, see Subchapter F (Marine Engineering) of this chapter.

(4) For inspection procedures of electrical engineering equipment and systems, see Subchapter J (Electrical Engineering) of this chapter.

(5) For inspection and testing standards of structural subdivision integrity, see § 72.01–25 of this subchapter.

(6) For inspection and testing of watertight doors, see § 73.35–30 of this subchapter.

SUBPART 71.25—ANNUAL INSPECTION

§ 71.25–1 *Prerequisite of reissuance of certificate of inspection.* (a) The annual inspection is a prerequisite of the reissuance of a certificate of inspection.

§ 71.25–5 *When made.* (a) The annual inspection will only be made upon the written application of the master, owner, or agent of the vessel on Form CG 833 to the Officer in Charge, Marine Inspection, at or nearest the port where the vessel is to be inspected.

§ 71.25–10 *Scope of inspection.* (a) The annual inspection shall include an inspection of the structure, boilers, machinery and equipment. The inspection shall be such as to insure that the vessel, as regards the structure, boilers and their appurtenances, piping, main and auxiliary machinery, electrical installations, lifesaving appliances, fire detecting and extinguishing equipment, and other equipment, is in satisfactory condition and fit for the service for which it is intended, and that it complies with the applicable regulations for such vessel, and that the radio installation is in compliance with the requirements of the Federal Communications Commission.

§ 71.25–15 *Lifesaving equipment.* (a) At each annual inspection, the inspector shall conduct the following tests and inspections of lifesaving equipment:

(1) It shall be demonstrated that the air tanks of all lifesaving appliances are airtight.

(2) Each lifeboat shall be lowered to near the water and then be loaded with its allowed capacity, evenly distributed throughout the length, and then be lowered into the water until it is afloat and be released from the falls. In making this test, persons or deadweight may be used. The total weight used shall be at least equal to the allowed capacity of the lifeboat considering persons to weigh 165 pounds each.

(3) Each life preserver or wood float shall be examined to determine its serviceability. If found to be satisfactory, it will be stamped "Passed," together with the date, the port, and the inspector's initials. If not in a serviceable condition, the life preserver or wood float shall be removed from the vessel. If the life preserver is beyond repair, it shall be destroyed in the presence of the inspector.

(4) All lifeboat winch electrical control apparatus shall be opened up and inspected.

(5) Where gravity davits are installed, it shall be demonstrated that each lifeboat can be swung out and lowered from

any stopped position by merely releasing the brake on the lifeboat winch. The use of force to start the davits or the lifeboat winch will not be permitted.

(6) All other items of lifesaving equipment shall be examined to determine that they are in suitable condition.

§ 71.25–20 *Fire detecting and extinguishing equipment.* (a) At each annual inspection, the inspector shall conduct the following tests and inspections of fire detecting and extinguishing equipment:

(1) All hand portable fire extinguishers and semiportable fire extinguishing systems shall be checked as noted in Table 71.25–20 (a) (1). In addition, the hand portable fire extinguishers and semiportable fire extinguishing systems shall be examined for excessive corrosion and general condition.

TABLE 71.25–20 (a) (1)

Type unit	Test
Soda acid	Discharge. Clean inside and hose thoroughly. Recharge.
Foam	Discharge. Clean inside and hose thoroughly. Recharge.
Pump tank (water or antifreeze).	Discharge. Clean inside and hose thoroughly. Recharge with clean water or new antifreeze.
Cartridge operated (water antifreeze or loaded stream)	If pressure cartridge is punctured, or if it weighs ½ ounce less than amount stamped on cartridge, it shall be replaced. Remove liquid. Clean inside and hose thoroughly. Recharge with clean water or new solution or antifreeze. Insert charged cartridge.
Carbon tetrachloride.	Discharge a few strokes into a clean container. Recharge with new or discharged liquid. Keep water out of extinguisher. Ascertain that it is completely full of liquid.
Carbon dioxide	Weigh cylinders. Recharge if weight loss exceeds 10 percent of weight of charge. Inspect hose and nozzle to be sure they are clear.
Dry chemical	If pressure cartridge is punctured, or if it weighs ½ ounce less than amount stamped on cartridge, it shall be replaced. Inspect hose and nozzle to be sure they are clear. Insert charged cartridge. Ascertain that chamber contains full charge and that powder is not caked.

(2) Fixed fire extinguishing systems shall be checked as noted in Table 71.25–20 (a) (2). In addition all parts of the fixed fire extinguishing systems shall be examined for excessive corrosion and general conditions.

TABLE 71.25–20 (a) (2)

Type system	Test
Foam	Systems utilizing a soda solution shall have such solution replaced. In all cases, ascertain that powder is not caked.
Carbon dioxide	Weigh cylinders. Recharge if weight loss exceeds 10 percent of weight of charge.

(3) On all fire detecting and extinguishing systems, all piping controls, valves, and alarms shall be checked to ascertain that the system is in operating condition. In this respect, automatic sprinkling systems shall be checked by means of test stations or opening heads, smoke detecting systems shall be checked by introducing smoke into the accumulators, fire detecting and manual alarm systems shall be checked by test stations or actuating detectors or pull boxes, and steam smothering lines shall be checked with at least a 50 p. s. i. air pressure with the ends capped or by blowing steam through the lines at the designed pressure.

(4) The fire main system shall be operated and the pressure checked at the most remote and highest outlets. All fire hose shall be subjected to a test pressure equivalent to the maximum pressure to which they may be subjected in service, but not less than 100 p. s. i.

§ 71.25–25 *Hull equipment.* (a) At each annual inspection, the inspector shall conduct the following tests and inspections of hull equipment:

(1) All subdivision bulkheads shall be examined to determine that their watertight integrity has not been impaired.

(2) All watertight doors shall be operated locally by manual power and also by hydraulic or electric power if so fitted. Where remote control is fitted, the doors shall also be operated by the remote control apparatus.

(3) All magnetically controlled fire doors shall be operated locally and by the remote control, and all automatic fire dampers shall be checked to determine that they are in an operable condition.

(4) The remote controls of all valves shall be operated.

§ 71.25–30 *Electrical engineering equipment* (a) For inspection procedures of electrical engineering equipment and systems, see subchapter J (Electrical Engineering) of this chapter.

§ 71.25–35 *Moving engineering equipment* (a) For inspection procedures of marine engineering equipment and systems, see Subchapter F. (Marine Engineering) of this chapter.

§ 71.25–40 *Sanitary inspection.* (a) At each annual inspection the passenger and crew quarters, toilet and washing spaces, galleys, serving pantries, lockers, etc., shall be examined by the inspector to be assured that they are in a sanitary condition.

§ 71.25–45 *Fire hazards.* (a) At each annual inspection, the inspector shall examine the tank tops and bilges in the machinery spaces to see that there is no accumulation of oil which might create a fire hazard.

§ 71.25–50 *Inspector not limited.* (a) Nothing in this subpart shall be construed as limiting the inspector from making such tests or inspections as he deems necessary to be assured of the safety and seaworthiness of the vessel.

SUBPART 71.30—REINSPECTION

§ 71.30–1 *When made.* (a) At least three reinspections shall be made on each vessel within each year. These reinspections will be made at approximately equal intervals between annual inspections. In the case of vessels with a seasonal schedule, these reinspections will be made during the operating season if practicable.

§ 71.30–5 *Scope.* (a) The inspector shall examine all accessible parts of the vessel's hull, machinery, and equipment to be assured that it is in a satisfactory condition.

(b) In general, the scope of the reinspection shall be the same as for the annual inspection, but will be in less detail unless it is determined that major change has occurred since the last annual inspection.

§ 71.30–10 *Inspector not limited.* (a) Nothing in this subpart shall be construed as limiting the inspector from making such tests or inspections as he deems necessary to be assured of the safety and seaworthiness of the vessel.

SUBPART 71.35—SPECIAL SURVEYS OF UNCLASSED VESSELS

§ 71.35–1 *Special surveys required.* (a) Special surveys, applicable to the age of the vessel and corresponding to class surveys, shall be conducted by inspectors on all unclassed vessels. These surveys shall in no way affect the thoroughness of the annual inspections.

§ 71.35–5 *When due.* (a) Special surveys shall be conducted at intervals of 4 years from date of build in the case of vessels operating in salt or brackish waters and intervals of 5 years for vessels operating exclusively in fresh water. In any case, the survey must be completed within one year from the date it is due. The designations of the special surveys and the dates due are as set forth in Table 71.35–5 (a).

TABLE 71.35–5 (a)

Designation of special survey	Date due, years from date of build	
	Salt water	Fresh water
Special Survey No. 1	4	5
Special Survey No. 2	8	10
Special Survey No. 3	12	15
Second Special Survey No. 1	16	20
Second Special Survey No. 2	20	25
Second Special Survey No. 3	24	30
Third Special Survey No. 1	28	35
Third Special Survey No. 2	32	40
Third Special Survey No. 3	36	45
Fourth Special Survey No. 1	40	50
(Etc.)	(etc.)	(etc.)

§ 71.35–10 *Marine engineering and electrical engineering requirements.* (a) For the scope of marine engineering requirements at special surveys, see Subchapter F (Marine Engineering) of this chapter.

(b) For the scope of electrical engineering requirements at special surveys, see Subchapter J (Electrical Engineering) of this chapter.

§ 71.35–15 *Inspector not limited.* (a) Nothing in this subpart shall be construed as limiting the inspector from making such tests or inspections as he deems necessary to be assured of the safety and seaworthiness of the vessel.

§ 71.35–20 *Scope of Special Survey No. 1.* (a) The vessel is to be placed in dry dock or upon a slipway, and the following examinations made:

(1) The keel, stem, stern frame or stern post, and outside planking or plating are to be cleaned and afterward examined, recalked, and recoated where necessary; the rudder is to be examined and lifted when required and the

gudgeons rebushed or the braces and pintles refitted as may be necessary.

(2) In the case of wooden vessels careful examination is to be made of the entire structure, faulty fastenings, bolts, or treenails backed out or otherwise dealt with to the satisfaction of the inspector. When, in the opinion of the inspector, it is necessary, borings are to be made and should they disclose cause for further examination, listings shall be made where and as required to satisfy the inspector.

(b) The holds, 'tween decks, peaks, bilges, engine and boiler spaces, and bunkers are to be cleaned out and the surfaces of the framing and plating are to be cleaned and examined and recoated where necessary. All the watertight bulkheads are to be examined, and tested if considered necessary, with a head of water.

(c) The platform plates in the engine and boiler spaces are to be removed when required, and in the holds and bunkers one strake of ceiling at the bilges and one strake of ceiling on each side fore and aft and all portable ceiling hatches are to be lifted. All limbers are to be cleaned free from dirt.

(d) The cement or other composition on the inner surface of the bottom plating to be carefully examined and tested, to ascertain if it is adhering satisfactorily to the plating.

(e) Where a double bottom is fitted, the tanks are to be thoroughly cleaned out and examined internally; sufficient ceiling is to be lifted or all the ceiling is to be lifted, if necessary, for cleaning and coating the top plating; and the tanks are to be tested with water pressure equal to the height of the load draft of the vessel.

(f) Where a double bottom and other tanks are used for fuel oil bunkers, the cleaning out of such tanks need not be insisted upon, provided the inspector is able to determine by an external examination that the general condition of the tanks is satisfactory. Tanks in such cases may be tested with oil to the height of the overflow.

(g) Deep water ballast tanks, peak ballast tanks, and fresh water tanks which form a part of the structure of the vessel are to be cleaned out and examined internally, and are to be tested with a head of water to a height of 8 feet above the crown of the tank, or to the height of the load draft of the vessel, or to the highest point to which liquid may arise under service conditions, whichever is highest.

(h) The decks are to be examined, and wood decks are to be bored where worn and renewed if reduced excessively, or if found otherwise defective.

(i) The masts, spars, rigging, hawse pipes and outfit are to be examined, and found or placed in good and efficient condition, and the anchors are to be examined and found or placed in good condition and their weight, type, and number noted.

(j) The hatch covers and fore-and-afters, the tarpaulins, the hatchway and ventilator coamings, deckhouses, the engine and boiler casings and all other means of protecting openings in the weather decks are to be examined, and found or placed in good condition.

(k) All parts of the steering arrangements together with the blocks, rods, chains, or other transmission gear are to be examined, and found or placed in good condition.

(l) The windlass, hand pumps, sluice valves, watertight doors, and air and sounding pipes are to be examined, and found or placed in good and efficient condition.

(m) When spaces are insulated in connection with refrigerating plant, the limbers and hatches are to be lifted and an examination is to be made in way of same.

§ 71.35–25 *Scope of Special Survey No. 2.* (a) All of the requirements for the Special Survey No. 1 shall be complied with in addition to the remaining requirements of this section.

(b) A second strake of ceiling on each side fore and aft and all portable ceiling hatches are to be lifted in the holds and bunkers.

(c) In the case of wooden vessels no planking is to be removed except, in the opinion of the inspector absolutely necessary to disclose the true condition of the vessel, or as may be found necessary, to effectively remedy the defects otherwise disclosed.

(d) Double bottom and other tanks used as fuel oil bunkers are to be thoroughly cleaned out, cleared of gas, and examined internally, and the tanks are to be tested with water pressure to the height of the overflow.

(e) The chain cables are to be ranged, the shackle pins driven out, and the cables examined, and if found reduced in sectional area at their most worn part to the extent represented by Table 71.35–25 (e) they must be renewed.

TABLE 71.35–25 (e)

Diameter of cable	Maximum reduction to be allowed (inch)
$\frac{5}{16}$ inch and under $1\frac{3}{16}$ inch	$\frac{1}{16}$
$1\frac{3}{16}$ inch and under $1\frac{4}{16}$ inches	$\frac{2}{16}$
$1\frac{4}{16}$ inches and under $1\frac{13}{16}$ inches	$\frac{3}{16}$
$1\frac{13}{16}$ inches and under 2 inches	$\frac{4}{16}$
2 inches and under $2\frac{8}{16}$	$\frac{5}{16}$
$2\frac{8}{16}$ inches and under 3 inches	$\frac{6}{16}$
3 inches and under $3\frac{5}{16}$ inches	$\frac{7}{16}$

§ 71.35–30 *Scope of Special Survey No. 3.* (a) All of the requirements for the Special Survey No. 2 shall be complied with in addition to the remaining requirements of this section.

(b) All the close ceilings, wood linings, and casings in the holds and bunkers, ceiling spars and platform plates in the engine and boiler spaces are to be lifted, and all rust throughout the vessel, both inside and outside, is to be removed.

(c) In respect to wooden vessels, treenails in the bilges must in all cases be backed out, the center line members must be carefully searched and refastened to the satisfaction of the inspector, and where faulty the refastening bolts must be driven through and clinched over rings.

(d) When the vessel is thus prepared, the outer and inner surfaces of the shell plating and the whole of the framing, floors, brackets, reverse bars, keelsons, girders, tank top plating, engine and boiler seatings, shaft tunnels, thrust and shaft stools, beams, watertight bulkheads, rivets, stringers, and decks are to be examined, and found or placed in good condition.

(e) If it is considered necessary by the inspector, the shell plating, deck plating, and such other parts of the vessel as are liable to excessive corrosion are to be drilled, and where a material reduction of over 25 percent in the original scantlings is found to have taken place, the defective parts are to be removed and replaced with new materials of the original scantlings and quality.

(f) In the case of wooden ships, the beam ends, knees, beam end connections and all principal parts to be carefully examined and bored as may be required by the inspector, and where necessary to ascertain the condition of the beam ends the deck plank adjacent to the lockstrakes should be removed.

(g) In cases where the deterioration of the scantlings is widespread, a detailed preliminary report with a sketch if possible is to be made by the inspector and forwarded immediately to Headquarters for its consideration.

(h) In the case of wooden vessels, listings are to be cut inside along seam lines, without disturbing fastenings, above and below the bilge strakes, so as to expose the timbers for one-third the length of the vessel, from each end on both sides, and at such additional and intermediate openings as the inspector may require.

(i) When all the rust has been removed, the surfaces of the iron and steel work throughout the vessel are to be recoated, but this should not be done until after examination by the inspector.

(j) In the case of wooden vessels, if considered necessary by the inspector, planking may, at his discretion, be removed on both sides of the vessel a length equal to one complete strake on one side; on both sides of the vessel under the counter, and from stem aft toward the foremast such length as the inspector may determine, but not less than eight frames. The inspector will, in his discretion, be careful not to have planking removed that has been removed on previous surveys or when the vessel's condition can be disclosed as, or made satisfactory without, disturbance to the planking.

(k) Where side lights are fitted, the condition of the plating in way of same is to be ascertained, and in way of cabin accommodation the lining may, in the first instance, be removed so that the inspector may judge of the condition of the hull at those parts, and if, upon such examination, he consider it necessary, additional lining must be removed.

(l) In the case of wooden ships all mast and bowsprit wedging is to be removed, and the condition of the plating of iron or steel masts, bowsprits, and spars tested by hammering or drilling, as may be found necessary.

(m) When spaces are insulated in connection with refrigerating plant, the limbers and hatches are to be lifted, and enough lining is to be removed from all the spaces to enable the inspector to sat-

isfy himself as to the general condition of the plating and framing in way of the insulation.

§ 71.35–35 *Scope of second and subsequent Special Surveys No. 1.* (a) All of the requirements for Special Survey No. 2 shall be complied with.

§ 71.35–40 *Scope of second and subsequent Special Surveys No. 2.* (a) All of the requirements for Special Survey No. 2 shall be complied with.

§ 71.35–45 *Scope of second and subsequent Special Surveys No. 3.* (a) All of the requirements for Special Survey No. 3 shall be complied with in addition to the remaining requirements of this section.

(b) The actual scantlings of the vessel throughout are to be ascertained by the inspector and reported by him in detail to the Headquarters. The bottom plating need not be drilled if the cement on same is adhering satisfactorily. Generally, when a material reduction of 25 percent or more is found the material is to be removed.

SUBPART 71.40—INSPECTION AFTER ACCIDENT

§ 71.40–1 *General or partial survey.* (a) A survey, either general or partial, according to the circumstances, shall be made every time an accident occurs or a defect is discovered which affects the safety of the vessel or the efficacy or completeness of its lifesaving appliances, fire-fighting or other equipment, or whenever any important repairs or renewals are made. The survey shall be such as to insure that the necessary repairs or renewals have been effectively made, that the material and the workmanship of such repairs or renewals are in all respects satisfactory, and that the vessel complies in all respects with the regulations in this subchapter.

SUBPART 71.45—SANITARY INSPECTIONS

§ 71.45–1 *When made.* (a) An inspection of passenger and crew quarters, toilet and washing spaces, serving pantries, galleys, etc., shall be made at least once in every month. If the route of the vessel is such that it is away from a United States port for more than one month, an inspection shall be conducted at least once every trip.

SUBPART 71.50—DRYDOCKING

§ 71.50–1 *When drydocked.* (a) All vessels shall be placed in drydock or hauled out for examination within the periods set forth in this paragraph, depending upon the service.

(1) Vessels whose operations in salt water service aggregate more than 6 months in a calendar year—once in each year.

(2) Vessels whose operations in salt water service aggregate 6 months or less in a calendar year—once in each 2 years.

(3) Vessels whose operations are confined exclusively to fresh water—once in each 5 years.

§ 71.50–5 *Notice by owner.* (a) The master, owner, or agent shall notify the Officer in Charge, Marine Inspection, when any vessel is to be placed on a drydock in order that an examination of the underwater portion of the vessel may be made if deemed necesasry.

SUBPART 71.55—REPAIRS AND ALTERATIONS

§ 71.55–1 *Permission required.* (a) No repairs or alterations affecting the safety of the vessel with regard to the hull, machinery, or equipment, shall be made without the knowledge of the Officer in Charge, Marine Inspection.

(b) Drawings of alterations shall be approved before work is started, unless deemed unnecessary by the Officer in Charge, Marine Inspection.

(c) Drawings will not be required for repairs in kind.

§ 71.55–5 *Inspection required.* (a) An inspection, either general or partial depending upon the circumstances, shall be made whenever any important repairs or alterations are undertaken.

SUBPART 71.60—GAS FREEING

§ 71.60–1 *Inspection necessary.* (a) No alterations, repairs, or operations involving riveting, welding, burning, etc., shall be made in or on the boundaries of oil tanks, oil lines, or oil heating coils until an inspection has been made to determine that such operation can be undertaken with safety. Such inspection shall be made and evidenced as follows:

(1) In a port of the United States, the inspection shall be made by a gas chemist certified by the American Bureau of Shipping. If the services of such certified chemist are not available, the Officer in Charge, Marine Inspection, may, upon the recommendation of the vessel's owner, or contractor, select a competent person to make the inspection. If the inspection reveals that the work may be undertaken with safety, the chemist or authorized person shall issue a certificate setting forth such facts, with any qualifications, before the work is started.

(2) When not in a port of the United States, and a gas chemist is not available, the inspection shall be made by the senior officer present and a proper entry shall be made in the log.

SUBPART 71.65—PLAN APPROVAL

§ 71.65–1 *General.* (a) The list of required plans is general in character, but includes all plans in § 71.65–5 which normally show construction and safety features coming under the cognizance of the Coast Guard. In the case of a particular vessel, all of the plans enumerated may not be applicable, and it is intended that only those plans and specifications be submitted as will clearly show the vessel's arrangement, construction and required equipment.

(b) In the list of required plans in § 71.65–5 the items which must be approved by the American Bureau of Shipping for vessels classed by that organization are indicated by an asterisk. When prints bearing record of such approval by the American Bureau of Shipping are forwarded to the Coast Guard they will in general be accepted as satisfactory except insofar as the law or the Coast Guard regulations contain requirements which are not covered by the American Bureau of Shipping.

§ 71.65–5 *Plans and specification required for new construction*—(a) *General.* (1) Specifications.

(2) General Arrangement Plan of decks, holds, inner bottoms, etc., and including inboard and outboard profile.

(b) *Hull structure.*[1] (1) *Inner Bottom Plating and Framing.

(2) *Midship Section.

(3) *Shell Plating and Framing.

(4) *Stem, Stern Frame, and Rudder.

(5) *Structural Deck Plans for Strength Decks.

(6) *Pillars and Girders.

(7) *Watertight and Oiltight Bulkheads.

(8) *Foundations for Main Machinery and Boilers.

(9) *Arrangement of Ports, Doors, and Airports in Shell Plating.

(10) *Hatch Coamings and Covers in Weather and Watertight Decks.

(11) *Details of Subdivision Watertight Doors and Operating Gear.

(12) *Scuppers and Drains Penetrating Shell Plating.

(c) *Hull calculations, etc.* (1) Lines (for information).

(2) Curves of Form.

(3) Floodable length Curves. Including calculations and construction drawings. (These drawings shall show all watertight subdivision, including inner bottom, bulkheads, flats, shaft tunnels, pipe tunnels, escape tunnels, etc., and the location and type of all subdivision watertight doors.)

(4) Calculations of Stability in Intact and Final Flooding Conditions.

(5) Capacity Plan showing capacities and vertical and longitudinal centers of gravity of cargo spaces, tanks, etc. (for information).

(6) Tank Sounding Tables (for information).

(7) Draft Mark Locations (for information).

(d) *Fire control.* (1) Fire control diagram showing location and type of all required fire-screen insulation, including main fire zone and subdivisions, stairway and elevator enclosures, control space enclosures, etc., and type of all doors in such subdivisions and enclosures.

(2) Comprehensive typical details of fire-screen insulation of both vertical and horizontal surfaces, including deck coverings where used, keyed by reference numbers to the "fire control diagram".

(3) Ventilation diagram including dampers and other fire control features.

(4) Alarm systems.

(5) Detecting systems.

(6) Extinguishing systems, including fire mains, carbon dioxide, steam, and sprinkling systems.

(7) Supervised Patrol Route.

(e) *Marine engineering.* (1) For plans required for marine engineering equipment and systems, see Subchapter F (Marine Engineering) of this chapter.

(f) *Electrical engineering.* (1) For plans required for electrical engineering equipment and systems, see Subchapter J (Electrical Engineering) of this chapter.

[1] The asterisk (*) indicates items which may require approval by the American Bureau of Shipping for vessels classed by that society.

(g) *Lifesaving equipment.* (1) These plans are to show the location and arrangement of embarkation decks, all overboard discharges and projections in way of launching lifeboats, weights of lifeboats fully equipped and loaded, working loads of davits and winches, types and sizes of falls, the manufacturer's name and identification for all equipment, and all other relevant and necessary information.

(i) Arrangement of lifeboats.

(ii) Arrangement of davits.

(iii) Location and stowage of life rafts and buoyant apparatus.

(h) *Crew's accommodations.* (1) Arrangement plans showing accommodations, ventilation, escapes, hospital, and sanitary facilities for all crew members.

§ 71.65–10 *Plans required for alterations of existing vessels.* (a) In the event of alterations involving the safety of the vessel, the applicable plans shall be submitted for approval covering the proposed work, except as modified by § 71.55–1 (b). The general scope of the plans shall be as noted in § 71.65–5.

§ 71.65–15 *Procedure for submittal of plans.* (a) As the relative location of shipyards, design offices, and Coast Guard offices vary throughout the country, no specific routing will be required in the submittal of plans. In general, one of the following procedures would apply, but in a particular case, if a more expeditious procedure can be used, there will be no objection to its adoption:

(1) The plans may be submitted to the Officer in Charge, Marine Inspection, in the District in which the vessel is to be built. This procedure will be most expeditious in the case of those offices where personnel and facilities are available for examination and approval of the plans locally.

(2) The plans may be submitted directly to the Commandant (MMT), U. S. Coast Guard, 1300 "E" Street, NW., Washington 25, D. C. In this case, the plans will be returned directly to the submitter, with a copy of the action being forwarded to the interested Officer in Charge, Marine Inspection.

(3) In the case of classed vessels, upon specific request by the submitter, the American Bureau of Shipping will arrange to forward the necessary plans to the Coast Guard indicating its action thereon. In this case, the plans will be returned as noted in subparagraph (2) of this paragraph.

§ 71.65–20 *Number of plans required.* (a) Three copies of each plan are normally required so that one can be returned to the submitter and one copy each can be retained by Coast Guard Headquarters and the Officer in Charge, Marine Inspection. If the submitter desires additional approved plans, a suitable number should be submitted to permit the desired distribution.

SUBPART 71.75—SAFETY CERTIFICATE

§ 71.75–1 Required on international voyages. (a) All vessels on an international voyage, and meeting the requirements of this subchapter, shall be issued and keep posted a safety certificate, and where applicable an exemption certificate, in accordance with the requirements of the International Convention for Safety of Life at Sea, 1948, Chapter I, Regulations 11 through 19.

PART 72—CONSTRUCTION AND ARRANGEMENT

Chapter I is amended by adding a new Part 72 in Subchapter H, reading as follows:

SUBPART 72.01—HULL STRUCTURE

Sec.
72.01–1 Application.
72.01–5 Vessels subject to load line.
72.01–10 Vessels using fuel having a flash point of 110 degrees F. or lower.
72.01–15 Structural standards.
72.01–20 Special consideration.
72.01–25 Structural subdivision requirements.
72.01–90 Vessels contracted for prior to November 19, 1952.

SUBPART 72.05—STRUCTURAL FIRE PROTECTION

72.05–1 Application.
72.05–5 Definitions.
72.05–10 Type, location, and construction of fire control bulkheads and decks.
72.05–15 Ceilings, linings, trim, and decorations in accommodation spaces and safety areas.
72.05–20 Stairways and elevator enclosures.
72.05–25 Doors, other than watertight.
72.05–30 Windows and airports.
72.05–35 Hatch covers and shifting boards.
72.05–40 Heat and refrigeration insulation.
72.05–45 Paint.
72.05–50 Ventilation.
72.05–55 Furniture and furnishings.
72.05–60 Motion picture projection and equipment.
72.05–90 Vessels contracted for prior to November 19, 1952.

SUBPART 72.10—MEANS OF ESCAPE

72.10–1 Application.
72.10–5 Two means required.
72.10–10 Location.
72.10–15 Vertical ladders not acceptable.
72.10–20 No means for locking door.
72.10–25 Stairway size.
72.10–30 Dead end corridors.
72.10–35 Public spaces.
72.10–40 Access to lifeboats.
72.10–45 Weather deck communications.
72.10–90 Vessels contracted for prior to November 19, 1952.

SUBPART 72.15—VENTILATION

72.15–1 Application.
72.15–5 Structural fire protection.
72.15–10 Vessels using fuel having a flash point of 110 degrees F. or lower.
72.15–15 Ventilation for closed spaces.
72.15–20 Ventilation for crew quarters and passenger spaces.
72.15–90 Vessels contracted for prior to November 19, 1952.

SUBPART 72.20—ACCOMMODATIONS FOR OFFICERS AND CREW

72.20–1 Application.
72.20–5 Intent.
72.20–10 Location of crew spaces.
72.20–15 Construction.
72.20–20 Sleeping accommodations.
72.20–25 Washrooms and toilet rooms.
72.20–30 Messrooms.
72.20–35 Hospital space.
72.20–40 Other spaces.
72.20–45 Lighting.
72.20–50 Heating.
72.20–55 Insect screens.
72.20–90 Vessels contracted for prior to November 19, 1952.

SUBPART 72.25—PASSENGER ACCOMMODATIONS

72.25–1 Application.
72.25–5 Steerage passengers.
72.25–10 Location of passenger quarters.
72.25–15 Passenger accommodations for excursion boats, ferryboats, and passenger barges.

SUBPART 72.40—RAILS AND GUARDS

72.40–1 Application.
72.40–5 Where rails required.
72.40–10 Storm rails.
72.40–15 Vehicular ferries.
72.40–20 Guards in dangerous places.
72.40–90 Vessels contracted for prior to November 19, 1952.

AUTHORITY: §§ 71.01–1 to 71.40–90 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4490, as amended, sec. 3, 24 Stat. 129, 41 Stat. 305, sec. 5, 49 Stat. 1384, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 482, 483, 363, 369, 367, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 72.01—HULL STRUCTURE

§ 72.01–1 *Application.* (a) The provisions of this subpart, with the exception of § 72.01–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 72.01–90.

§ 72.01–5 *Vessels subject to load line.* (a) For vessels asigned a load line, see Subchapter E (Load Lines) of this chapter, for special requirements as to strength, closure of openings, etc.

§ 72.01–10 *Vessels using fuel having a flash point of 110 degrees F. or lower.* (a) Where liquid fuel having a flash point of 110 degrees F. or lower is carried for main or auxiliary machinery or for starting purposes, such machinery and fuel tanks shall be in separate vapor tight compartments separating each from the other and from the remainder of the vessel.

§ 72.01–15 *Structural standards.* (a) In general, compliance with the standards established by the American Bureau of Shipping, see Subpart 70.35 of this subchapter, will be considered satisfactory evidence of the structural efficiency of the vessel. However, in special cases, a detailed analysis of the entire structure or some integral part may be made by the Coast Guard to determine the structural requirements.

§ 72.01–20 *Special consideration.* (a) Special consideration will be given to the structural requirements for vessels, such as small vessels or vessels of unusual design not contemplated by the standards established by the American Bureau of Shipping, see Subpart 70.35 of this subchapter.

§ 72.01–25 *Structural subdivision requirements.* (a) Vessels required by Part 73 of this subchapter to have subdivision bulkheads, double bottoms, etc.,

shall comply with the following structural subdivision requirements:

(1) Watertight subdivision bulkheads, whether transverse or longitudinal, shall be constructed to withstand with a proper margin of resistance the pressure due to a head of water up to the margin line in way of each bulkhead. The construction of the bulkheads shall be to the satisfaction of the Commandant.

(2) Steps and recesses in subdivision bulkheads shall be watertight and as strong as the bulkhead at the place where each occurs. Decks, trunks, tunnels, duct keels, ventilators, etc., that are made watertight to maintain the subdivision requirements for a vessel shall be of the same strength as the bulkhead at the corresponding levels. The means used for making them watertight and the arrangements adopted for closing openings in them shall be to the satisfaction of the Commandant. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck.

(3) Where frames or beams pass through a watertight bulkhead or deck, such bulkhead or deck shall be made structurally watertight without the use of wood, cement, or similar materials.

(4) Subdivision bulkheads, including steps, recesses, trunks, tunnels, ventilators, etc., which might form part of such bulkheads, shall be thoroughly examined and hose tested upon completion of construction. The water pressure for such tests shall be at least 30 p. s. i. Testing of main compartments by filling them with water is not compulsory.

(5) The forepeak, double bottoms (including duct keels), and inner skins shall be tested with water to-a-head up to the margin line upon completion of construction.

(6) The watertight space enclosing the stern tube shall be tested by filling with water to-a-head up to the deepest subdivision load line.

(7) Tanks which are intended to hold liquids, and which form part of the subdivision of the vessel, shall be tested for tightness upon completion of construction with water to-a-head up to the deepest subdivision load line or to-a-head corresponding to ⅔ of the depth from the top of the keel to the margin line in way of the tanks, whichever is greater; but in no case shall the test-head be less than 3 feet above the top of the tank.

(8) The tests referred to in the preceding subparagraphs (5), (6), and (7) of this paragraph, are for the purpose of insuring that the subdivision structural arrangements are watertight and are not regarded as a test of the fitness of any compartment for the storage of oil, fuel or for other specific purposes for which a test of a superior character may be required depending upon the height to which the liquid has access in the tank or its connections.

§ 72.01–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing structure previously approved will be considered satisfactory so long as it is maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

SUBPART 72.05—STRUCTURAL FIRE PROTECTION

§ 72.05–1 *Application.* (a) The provisions of this subpart shall apply to all vessels of 100 gross tons and over, or to any vessel on an international voyage, and with the exception of § 72.05–90, shall apply to all such vessels contracted for on or after November 19, 1952. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of § 72.05–90.

§ 72.05–5 *Definitions.*

NOTE: The parenthetical number after each space refers to the applicable column and row number in Tables 72.05–10 (d) through (g).

(a) "Safety areas" will be considered as including the following spaces:

(1) Control stations, i. e., those spaces in which a continuous watch is maintained and in which navigating, radio, or fire-control equipment is located. (1)

(2) Passenger and crew stairway and elevator enclosures. (2)

(3) Passenger and crew communicating corridors. (3)

(4) Open decks and enclosed promenades in way of lifeboat embarkation or lowering positions. (4)

(b) "Accommodation spaces" will be considered as including the following spaces:

(1) Public spaces, such as halls, dining rooms, mess rooms, lounges, cafes, and other similar spaces normally accessible during the voyage. (5) through (7) (Depending upon size and furnishings.)

(2) Public sales rooms and similar spaces. (6) or (7) (Depending on size.)

(3) Staterooms, including passenger and crew rooms, barber shops, beauty parlors, offices, dispensaries, etc. (5) or (6) (Depending on furnishings.)

(4) Washrooms and toilet spaces, both public and private. (8)

(5) Isolated lockers and small storerooms in accommodation areas. (6)

(6) Isolated serving pantries, etc., in accommodation areas, with incombustible furnishings. (8)

(7) Operating rooms. (8)

(8) Small laundries containing only tubs and washing machines, with no facilities for drying. (8)

(9) Small cleaning gear lockers containing only slop sinks, and having no room for stowing materials other than a broom, mop, cleaning powder, soap, etc. (8)

(10) Large cleaning gear lockers having considerable stowage space. (6) or (9)

(c) "Service spaces" will be considered as including the following spaces:

(1) Motion picture projection rooms and film stowage rooms where nitrocellulose film is used. (10) (Where acetate or slow-burning film is used, such spaces may be taken as (6), (9), or (10).)

(2) Galleys, main pantries, and storerooms, including alleyways and stairs, part of and for the exclusive use of such spaces. (9)

(3) Diet kitchens. (6) or (9) (Depending on furnishings.)

(4) Work shops (not part of machinery spaces, galleys, etc.), large laundries, drying rooms, mail and baggage rooms, etc. (9)

(5) Garbage disposal and stowage rooms, and trash stowage rooms. (9)

(6) Paint and lamp rooms, and similar spaces containing highly combustible materials. (9)

(d) "Machinery spaces" will be considered as including the following spaces:

(1) Main machinery spaces, including trunks and casings, alleyways, gratings, and stairways, part of and for the exclusive use of these spaces, auxiliary machinery spaces containing internal combustion machinery or other oil burning, heating, or pumping units, and fuel oil filling stations. (11)

(2) Auxiliary machinery spaces containing only pumps, tanks, electrical machinery, ventilation or air conditioning equipment, resistors, steering machinery, etc. (13) (Where such spaces contain considerable stowage space for combustibles (11).)

(e) "Cargo spaces" will be considered as including the following spaces:

(1) Cargo holds, lockers, and trunks, both accessible and inaccessible and including refrigerated cargo spaces and cargo oil tanks intended for the alternate carriage of dry cargo. (12)

(2) Cargo oil tanks if not intended for the alternate carriage of dry cargo. (13)

(f) "Miscellaneous spaces" will be considered as including the following spaces:

(1) Fuel and water tanks and voids. (13)

(2) Open decks and enclosed promenades except in way of lifeboat embarkation and lowering positions. (14)

(3) Shaft alleys when separated from machinery spaces, and containing no space assigned for the stowage of combustibles. (13)

(g) A "standard fire test" is one which develops in the test furnace a series of time-temperature relationships as follows:

5 minutes	1,000° F.
10 minutes	1,300° F.
30 minutes	1,550° F.
60 minutes	1,700° F.

(h) "Main vertical zones" are those sections, the mean length of which does not, in general, exceed 131 feet, into which the hull, superstructure and deck houses are required to be divided by fire-resisting bulkheads.

(i) "Horizontal zones" are those sections which are bounded by the main vertical zone bulkheads, the shell, and by any two decks or by a tank top and an adjacent deck, where such decks are intact to shell and bulkheads.

(j) Where the term "steel or other equivalent metal" is used in this part, it is intended to require a material which, by itself or due to insulation provided, has structural and integrity qualities equivalent to steel at the end of the applicable fire exposure.

(k) Working spaces will be considered as only those service and machinery spaces where personnel are normally employed as contrasted to those where personnel may occasionally visit or be employed for short periods of time.

(l) Passenger or crew corridors over 8 feet in width will be considered as public spaces for the purpose of this subpart.

§ 72.05–10 *Type, location, and construction of fire control bulkheads and decks.* (a) The hull, structural bulkheads, decks, and deck houses shall be constructed of steel or other equivalent metal construction of appropriate scantlings.

(b) The hull, superstructure, and deck houses shall be subdivided by suitable structural steel or other equivalent metal bulkheads into main vertical zones, the mean length of which shall not, in general, exceed 131 feet. However, on vessels designed for special purposes, such as automobile or railroad car ferries, where the installation of such bulkheads would defeat the purpose for which the vessel is intended, equivalent means for controlling and limiting a fire may be substituted if specifically approved by the Commandant.

(c) All bulkheads and decks shall be classed as A–60, A–30, A–15, A–O, B–15, B–O, or C, depending upon the type of space on each side of the bulkhead or above and below the deck.

(1) Bulkheads or decks of the "A" Class shall be composed of steel or equivalent metal construction, suitably stiffened and made intact with the main structure of the vessel, such as shell, structural bulkheads, and decks. They shall be so constructed that, if subjected to the standard fire test, they would be capable of preventing the passage of flame or smoke for one hour. In addition, they shall be so insulated with approved structural insulation, bulkhead panels, or deck covering that the average temperatures on the unexposed side would not rise more than 250 degrees F. above the original temperature, nor would the temperature at any one point rise more than 325 degrees F. above the original temperature, within the time listed below:

Class A–60..... 60 minutes.
Class A–30..... 30 minutes.
Class A–15..... 15 minutes.
Class A–0..... 0 minutes (i. e., no insulation requirements).

(2) Bulkheads of the "B" Class shall be constructed with approved incombustible materials and made intact from deck to deck (or to ceiling as provided in § 72.05–10 (h)) and to shell or other boundaries. They shall be so constructed that, if subjected to the standard fire test, they would be capable of preventing the passage of flame for ½ hour. In addition, their insulation value shall be such that the temperature of the unexposed side would not rise more than 250 degrees F. above the original temperature within the time listed below:

Class B–15..... 15 minutes.
Class B–0..... 0 minutes (i. e., no insulation requirements).

(3) Class C bulkheads or decks shall be constructed of approved incombustible materials, but need meet no requirements relative to the passage of flame nor the limiting of temperature rise.

(d) The minimum requirements for the bulkheads between the various spaces, where such bulkheads form the boundaries of main vertical zones, shall be as noted in Table 72.05–10 (d).

(e) The minimum requirements for the bulkheads between the various spaces, where such bulkheads do not form the boundaries of main vertical zones, shall be as noted in Table 72.05–10 (e).

(f) The minimum requirements for the decks between the various spaces, where such decks form the boundaries of stepped main vertical zones, shall be as noted in Table 72.05–10 (f).

(g) The minimum requirements for the decks between the various spaces, where such decks do not form the boundaries of stepped main vertical zones, shall be as noted in Table 72.05–10 (g).

(h) Where ceilings or linings are fitted, "B" Class bulkheads, with the exception of those forming passageways, may stop at the ceiling or lining and need not continue to the deck or shell, provided the ceiling and/or lining is erected as indicated in paragraph (j) of this section. However, draft stops meeting at least Class B–O requirements shall be fitted between the ceiling or lining and the deck or shell so that the maximum fore and aft length of the enclosed space shall not exceed 45 feet.

(i) Where Class B–15 bulkhead panels are required to go beyond the ceiling to the deck above, or beyond the lining to the shell, the portion of the bulkhead panel within the void space need only meet B–O requirements.

(j) Where Class B–15 panels are used, they should be efficiently secured by steel or equivalent metal flanges on both sides of the panel offering at least ¾ inch coverage of the panel. Other equivalent methods of construction may be specifically approved by the Commandant.

(k) Any sheathing, furring, or holding pieces incidental to the securing of structural insulation shall be of approved incombustible materials.

(l) Where linings or bulkhead panels are framed away from the shell or structural bulkheads, the deck within the void space so formed need only meet Class A–O requirements.

(m) Accommodation spaces, other than washrooms and toilet spaces, sepa-

TABLE 72.05–10 (d)

This space → / Adjacent to this space ↓		Control stations	Stairway and elevator enclosure	Corridors	Lifeboat embarkation or lowering stations	Staterooms and all public spaces with incombustible veneers and trim and fire resistant furnishings	Staterooms and public spaces of 500 square feet or less with combustible furnishings and isolated storerooms	Public spaces over 500 square feet with combustible furnishings	Washrooms, toilet spaces, and isolated pantries with incombustible fittings	Galleys, main pantries, storerooms, and workshops	Motion picture projection and film stowage rooms	Machinery	Dry cargo spaces	Fuel and water tanks and voids	Open decks and enclosed promenades (not safety areas)
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control stations	1	A–60	A–15	A–15	A–0	A–30	A–60	A–60	A–0	A–60	A–60	A–60	A–60	A–0	A–0
Stairway and elevator enclosures	2	.....	A–0	A–0	A–0	A–0	A–60	A–60	A–0	A–60	A–60	A–60	A–60	A–0	A–0
Corridors	3	.....	.....	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–30	A–0	A–0	A–0	A–0
Lifeboat embarkation or lowering stations	4	.....	.....	.....	C	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	C
Staterooms and all public spaces with incombustible veneers and trim and fire resistant furnishings	5	.....	.....	.....	.....	A–15	A–15	A–15	A–0	A–30	A–30	A–30	A–30	A–0	A–0
Staterooms and public spaces of 500 square feet or less with combustible furnishings, and isolated storerooms	6	.....	.....	.....	.....	.....	A–60	A–60	A–0	A–60	A–60	A–60	A–60	A–0	A–0
Public spaces over 500 square feet with combustible furnishings	7	.....	.....	.....	.....	.....	.....	A–60	A–0	A–60	A–60	A–60	A–60	A–0	A–0
Washrooms, toilet spaces, and isolated pantries with incombustible fittings	8	.....	.....	.....	.....	.....	.....	.....	A–0	A–0	A–0	A–0	A–0	A–0	A–0
Galleys, main pantries, storerooms, and workshops	9	.....	.....	.....	.....	.....	.....	.....	.....	A–0	A–60	A–0	A–0	A–0	A–0
Motion picture projection and film stowage rooms	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	A–60	A–60	A–60	A–0	A–0
Machinery spaces	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	A–0	A–0	A–0	A–0
Dry cargo spaces	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	A–0	A–0	A–0
Fuel and water tanks and voids	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	A–0	A–0
Open decks and enclosed promenades (not safety areas)	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	C

rated from corridors or other spaces covered by the supervised patrol by bulkheads of the "B" Class shall have a louver in the door. In lieu of the louver in the door, a screened opening approximately one inch in diameter will be accepted. Such opening, to permit smoke to be detected by the patrol, shall be located as high as practicable in the bulkhead. In the event of a double bulkhead or similar construction, a suitable hollow sleeve or tube shall connect the inner and outer surfaces of the bulkhead.

(n) Decks within accommodation spaces and safety areas may have an overlay for leveling or finishing purposes which need not meet the requirements for an approved deck covering. Such an overlay will not be considered as giving any insulating value and may not in general exceed ⅜ of an inch in thickness. Greater thicknesses may be specifically approved by the Commandant for specific locations.

(o) Rugs and carpets may be used in addition to any deck covering or overlay installed. Rugs and carpets used in stairways or corridors shall be of wool, or other materials having equivalent fire-resistive qualities.

(p) Decking within surgical operating rooms shall be of a type which is acceptably conductive to prevent accumulation of dangerous electrostatic charges, and shall be in general agreement with "Recommended Safe Practice for Hospital Operating Rooms", of issue in effect at the time the vessel is contracted for, published by the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.

(q) Decks in washrooms and toilet spaces, service, cargo, and machinery spaces, open decks and enclosed promenades may have an overlay in any thickness. This overlay need not meet the requirements for an approved deck covering.

§ 72.05–15 *Ceilings, linings, trim, and decorations in accommodation spaces and safety areas.* (a) Ceilings and linings and any furring incidental to their erection shall be of approved incombustible materials. Where such ceilings or

TABLE 72.05–10 (e)

This space → / Adjacent to this space ↓		1 Control stations	2 Stairway and elevator enclosures	3 Corridors	4 Lifeboat embarkation or lowering stations	5 Staterooms and all public spaces with incombustible veneers and trim and fire resistant furnishings	6 Staterooms and public spaces of 500 square feet or less with combustible furnishings and isolated storerooms	7 Public spaces over 500 square feet with combustible furnishings	8 Washrooms, toilet spaces, and isolated pantries with incombustible fittings	9 Galleys, main pantries, storerooms, and workshops	10 Motion picture projection and film stowage rooms	11 Machinery spaces	12 Dry cargo spaces	13 Fuel and water tanks and voids	14 Open decks and enclosed promenades (not safety areas)
Control stations	1	B–0	A–0	A–0	A–0	A–15	A–60	A–60	A–0	A–60	A–30	A–60	A–60	A–0	A–0
Stairway and elevator enclosures	2	-----	C	A–0	A–0	A–0	A–60	A–60	A–0	A–60	A–15	A–60	A–60	A–0	A–0
Corridors	3	-----	-----	C	A–0	B–0	B–15	A–0	B–0	A–0	A–15	A–0	A–0	A–0	A–0
Lifeboat embarkation or lowering stations	4	-----	-----	-----	C	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	C
Staterooms and all public spaces with incombustible veneers and trim and fire-resistant furnishings	5	-----	-----	-----	-----	B–0	B–15	A–15	B–0	A–15	A–15	A–15	A–15	A–0	A–0
Staterooms and public spaces of 500 square feet or less with combustible furnishings, and isolated storerooms	6	-----	-----	-----	-----	-----	B–15	A–30	B–0	A–60	A–15	A–60	A–60	A–0	A–0
Public spaces over 500 square feet with combustible furnishings	7	-----	-----	-----	-----	-----	-----	A–60	B–0	A–60	A–15	A–60	A–60	A–0	A–0
Washrooms, toilet spaces and isolated pantries with incombustible fittings	8	-----	-----	-----	-----	-----	-----	-----	C	A–0	A–0	A–0	A–0	A–0	A–0
Galleys, main pantries, storerooms, and workshops	9	-----	-----	-----	-----	-----	-----	-----	-----	C	A–15	A–0	A–0	A–0	A–0
Motion-picture projection and film-stowage rooms	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	A–15	A–15	A–15	A–0	A–0
Machinery spaces	11	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	C	A–0	A–0	A–0
Dry cargo spaces	12	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	A–0	A–0	A–0
Fuel and water tanks and voids	13	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	A–0	A–0
Open decks and enclosed promenades (not safety areas)	14	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	C

TABLE 72.05–10 (f)

This space above → / This space below ↓		1 Control stations	2 Stairway and elevator enclosures	3 Corridors	4 Lifeboat embarkation or lowering stations	5 Staterooms and all public spaces with incombustible veneers and trim and fire resistant furnishings	6 Staterooms and public spaces of 500 square feet or less with combustible furnishings and isolated storerooms	7 Public spaces over 500 square feet with combustible furnishings	8 Washrooms, toilet spaces, and isolated pantries with incombustible fittings	9 Galleys, main pantries, storerooms, and workshops	10 Motion picture projection and film stowage rooms	11 Machinery spaces	12 Dry cargo spaces	13 Fuel and water tanks and voids	14 Open decks and enclosed promenades (not safety areas)
Control stations	1	A–60	A–60	A–30	A–0	A–15	A–60	A–60	A–0	A–0	A–60	A–0	A–0	A–0	A–0
Stairway and elevator enclosures	2	A–15	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0
Corridors	3	A–30	A–0	A–0	A–0	A–0	A–0	A–15	A–0	A–0	A–0	A–0	A–0	A–0	A–0
Lifeboat embarkation or lowering stations	4	A–0	A–0	A–0	C	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	C
Staterooms and all public spaces with incombustible veneers and trim and fire-resistant furnishings	5	A–30	A–30	A–15	A–0	A–15	A–15	A–30	A–0	A–0	A–30	A–0	A–0	A–0	A–0
Staterooms and public spaces of 500 square feet or less with combustible furnishings, and isolated storerooms	6	A–60	A–60	A–30	A–15	A–15	A–60	A–60	A–0	A–0	A–60	A–0	A–0	A–0	A–0
Public spaces over 500 square feet with combustible furnishings	7	A–60	A–60	A–60	A–30	A–30	A–60	A–60	A–0	A–0	A–60	A–0	A–0	A–0	A–0
Washrooms, toilet spaces, and isolated pantries with incombustible fittings	8	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0
Galleys, main pantries, storerooms, and workshops	9	A–60	A–60	A–60	A–30	A–30	A–60	A–60	A–0	A–0	A–60	A–0	A–0	A–0	A–0
Motion picture projection and film stowage rooms	10	A–60	A–60	A–60	A–15	A–30	A–60	A–60	A–0	A–60	A–60	A–60	A–60	A–0	A–0
Machinery spaces	11	A–60	A–60	A–60	A–30	A–30	A–60	A–60	A–0	A–0	A–60	A–0	A–0	A–0	A–0
Dry cargo spaces	12	A–60	A–60	A–60	A–30	A–30	A–60	A–60	A–0	A–0	A–60	A–0	A–0	A–0	A–0
Fuel and water tanks and voids	13	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0
Open decks and enclosed promenades (not safety areas)	14	A–0	A–0	A–0	C	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	A–0	C

TABLE 72.05-10 (g)

This space above → / This space below ↓		Control stations	Stairway and elevator enclosures	Corridors	Lifeboat embarkation or lowering stations	Staterooms and all public spaces with incombustible veneers and trim and fire resistant furnishings	Staterooms and public spaces of 500 square feet or less with combustible furnishings and isolated storerooms	Public spaces over 500 square feet with combustible furnishings	Washrooms, toilet spaces and isolated pantries with incombustible fittings	Galleys, main pantries, storerooms and workshops	Motion picture projection and film stowage rooms	Machinery spaces	Dry cargo spaces	Fuel and water tanks and voids	Open decks and enclosed promenades (not safety areas)
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control stations	1	A-30	A-30	A-15	A-0	A-0	A-15	A-30	A-0	A-0	A-15	A-0	A-0	A-0	A-0
Stairway and elevator enclosures	2	A-0	C	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Corridors	3	A-15	A-0	A-0	A-0	A-0	A-0	A-15	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Lifeboat embarkation or lowering stations	4	A-0	A-0	A-0	C	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	C
Staterooms and all public spaces with incombustible veneers and trim and fire resistant furnishings	5	A-15	A-15	A-0	A-0	A-0	A-0	A-15	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Staterooms and public spaces of 500 square feet or less with combustible furnishings and isolated storerooms	6	A-60	A-60	A-30	A-15	A-0	A-30	A-60	A-0	A-0	A-15	A-0	A-0	A-0	A-0
Public spaces over 500 square feet with combustible furnishings	7	A-60	A-60	A-60	A-30	A-15	A-60	A-60	A-0	A-0	A-30	A-0	A-0	A-0	A-0
Washrooms, toilet spaces, and isolated pantries with incombustible fittings	8	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Galleys, main pantries, storerooms, and workshops	9	A-60	A-60	A-60	A-30	A-15	A-60	A-60	A-0	A-0	A-60	A-0	A-0	A-0	A-0
Motion picture projection and film stowage rooms	10	A-60	A-30	A-30	A-15	A-15	A-15	A-15	A-0	A-15	A-15	A-15	A-15	A-0	A-0
Machinery spaces	11	A-60	A-60	A-60	A-30	A-15	A-60	A-60	A-0	A-0	A-60	C	A-0	A-0	A-0
Dry cargo spaces	12	A-60	A-60	A-60	A-30	A-15	A-60	A-60	A-0	A-0	A-60	A-0	A-0	A-0	A-0
Fuel and water tanks and voids	13	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open decks and enclosed promenades (not safety areas)	14	A-0	A-0	A-0	C	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	C

linings are given credit for their insulating value in obtaining a bulkhead or deck classification, they shall be of Class B-15 bulkhead panel material, and the construction shall be as required by § 72.05-10 (j).

(b) Bulkheads, linings, and ceilings, may have a combustible veneer on each side not exceeding 2/28 of an inch in thickness. However, combustible veneers shall not be used in passageways or stairway enclosures, or in spaces specifically restricted by Tables 72.05-10 (d) through (g).

(c) The total board feet of combustible face trim, moldings, and decorations, including veneers, in any compartment shall not exceed 10 percent of a figure representing the total square feet of the combined walls of the compartment. Such trim, molding, or decorations shall not perform any structural function, and shall not be used in corridors or stairway enclosures.

(d) Combustible veneers shall not be used in hidden spaces, such as behind linings or ceiling or in the interior of double bulkhead construction.

(e) Partial bulkheads or decks used to subdivide a space for artistic treatment, privacy, etc., shall meet the requirements of Class C bulkheads.

§ 72.05-20 *Stairways and elevator enclosures.* (a) A suitable number of enclosed stair towers shall be provided so that, independent of adjoining Main Vertical Zones, escape may be effected from any safety area, accommodation space, or working space to all other decks having similar type spaces within the same Main Vertical Zone without coming out of the stair tower enclosures. Each stair tower shall give access to at least 1 weather deck. The vertical escape from the machinery space need not be enclosed within the space.

(b) Stairways and elevators shall be enclosed in "A" Class bulkheads and decks except as noted below:

(1) A stairway or elevator serving only 2 decks need not be enclosed provided the integrity of the deck is maintained by proper bulkheads and doors at 1 level.

(2) Stairways may be fitted in the open in a public space provided they lie wholly within such space. However, such stairways may not serve as one of the required means of escape from such space.

(c) The stringers and treads of all interior stairways shall be of steel construction. Balustrade risers and trim shall be of approved incombustible materials.

(d) Insofar as is reasonable and practicable, stairway enclosures should not contain direct access to accommodation or other enclosed spaces in which a fire may originate.

(e) Elevators shall not be considered as one of the required means of escape.

§ 72.05-25 *Doors, other than watertight.* (a) The general requirements for doors, other than watertight doors, are as follows:

(1) All doors shall be capable of operation from either side by 1 person.

(2) In public spaces, stairway enclosures, corridors, etc., all doors shall open in the direction of escape where practicable.

(3) If it is desired to use decorative doors in addition to those required, they shall be constructed of approved incombustible materials and shall not interfere with the normal operation of the required doors, and shall open in the same direction if the required doors are in a main avenue of escape.

(4) For the purpose of this subpart, all glass permitted in doors shall be at least ¼ inch thick. However, greater thickness may be required for strength purposes in certain locations. Except for hardwood doors permitted by paragraph (b) (8) of this section, all glass shall be fitted in steel or equivalent metal frames and shall be retained by steel or equivalent metal glazing beads or angles.

(5) Where wire-inserted glass is required, and the single wire type is employed, the strands shall run horizontally and shall be not more than 2 inches apart.

(6) Where hose ports are fitted, they shall be cut in the lower corner of the door on the side opposite the hinge so that if the hose is passed through the doorway when the door is open, it may be closed over the hose. The cut for the hose port should be approximately 6 inches square. A hinged or pivoted steel or equivalent metal cover shall be fitted in the cut, equipped with a bullet catch or similar method of fastening which will permit easy and automatic operation of the hinged cover.

(7) Combustible veneers may be used in doors where permitted for, and subject to the same conditions as, the bulkheads in which the doors are hung.

(8) The locking of doors may be permitted, except as noted in § 72.10-20.

(b) Doors in "A" Class bulkheads shall meet the following requirements:

(1) Doors in bulkheads required to be Class A-60, A-30, or A-15 shall be of hollow steel or equivalent metal construction solidly filled with approved structural insulation capable of meeting the requirements for a Class A-15 bulkhead.

(2) Doors in bulkheads required to be Class A-0 shall be of solid or hollow steel or equivalent metal construction capable of meeting the requirements of a Class A-0 bulkhead.

(3) Doors shall have a latch with a minimum throw of ¾ inch which can be operated from either side of the door. Double swing doors, where permitted for the proper utility of the space, may have the latch normally inoperative.

(4) Doors may be fitted with not more than 100 square inches of glass, which shall be of the wire inserted type.

(5) Vent grilles or louvers shall not be used in doors of this type.

(6) The bottoms of doors may be undercut not to exceed ½ inch above the door sill or top of approved deck covering. Rugs, and carpets, shall not pass through doorways, but linoleum and similar coverings may do so.

(7) Door frames shall be of rigid construction, and shall provide at least a ½ inch door stop at the sides and top, except:

(i) Double doors capable of independent operation and latching may have a clearance between the doors not to exceed ⅛ inch. However, if one door must always be closed first, a door stop of at least ½ inch shall be provided for the second door.

(ii) Double swing doors, where permitted, may have a maximum clearance of ⅛ inch at the tops and sides.

(8) Doors opening out onto open decks shall either meet the applicable requirements of this paragraph, or they may be of hardwood having a minimum thickness of 1¾ inches. In any case, no restriction as to the area of glass will be made for such doors insofar as this subpart is concerned. Only glass of the wire-inserted type may be fitted in such doors opening onto safety areas from accommodation spaces containing combustible type furniture and service, cargo, and machinery spaces.

(9) Doors in stairway enclosures and Main Vertical Zone bulkheads shall, in addition to meeting the requirements of this paragraph, also meet the following requirements:

(i) Doors, other than those which are normally locked, such as from staterooms, fan rooms, lockers, etc., shall be of the self-closing type capable of closing against a 3½ degree list, and such doors shall be numbered in accordance with § 78.47–35.

(ii) All doors, except those that are kept normally closed, shall be of a type which are capable of release from the control station and from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption to the control system; however, approved power operated watertight doors will be considered acceptable for this purpose. Holdback hooks, or other means of permanently holding the door open, not subject to control station release, will not be permitted. When double swing doors are permitted, they shall have a latch arrangement which is automatically engaged by the operation of the door release system.

(9) (iii) Double doors shall be so arranged that either door may be closed and latched independently.

(10) For doors to projection rooms, see § 72.05–60.

(c) Doors in "B" Class bulkheads shall meet the following requirements:

(1) Doors may be of solid or hollow steel or equivalent metal construction or may be of steel or equivalent metal frame with glass panes or may be of approved incombustible materials of such construction as specifically approved by the Commandant.

(2) No restriction as to the area of glass will be made for such doors, but all glass shall be of the wire-inserted type.

(3) The lower half of such doors may contain vent grilles or louvers with a net area not to exceed 2 square feet.

(4) Doors shall have a latch with a minimum throw of ⅜ inch which can be operated from either side of the door. Double swing doors, where permitted for the proper utility of the space, may have the latch normally inoperative.

(5) The bottoms of doors may be undercut not to exceed 1 inch above the door sill or top of approved deck covering. Rugs and carpets shall not pass through doorways but linoleum and similar coverings may do so.

(6) Doors frames shall be of rigid construction, and shall provide at least a ½ inch doorstop at the sides and top, except:

(i) Double doors capable of independent operation and latching may have a clearance between the doors not to exceed ⅛ inch. However, if one door must always be closed first, a door stop of at least ½ inch shall be provided for the second door.

(ii) Double swing doors, where permitted, may have a maximum clearance of ⅛ inch at the tops and sides.

(d) Doors in bulkheads required to be Class C shall be of approved incombustible materials.

§ 72.05–30 *Windows and air ports.* (a) For the purpose of this subpart, all glass in windows or air ports shall be at least ¼ inch thick. However, greater thickness may be required for strength purposes in certain locations. All glass shall be fitted in steel or equivalent metal frames and shall be retained by steel or equivalent metal glazing beads or angles.

(b) Where wire-inserted glass is required, and the single wire type is employed, the strands shall run horizontally and shall be not more than 2 inches apart.

(c) Windows or air ports opening onto safety areas from service, cargo, or machinery spaces, or from accommodation spaces other than those containing incombustible veneers and trim and fire resistant furnishings, and windows within accommodation spaces, shall be fitted with wire-inserted glass.

§ 72.05–35 *Hatch covers and shifting boards.* (a) Wood hatch covers may be used between cargo spaces. Hatch covers in other locations shall meet the requirements for deck construction noted in Tables 72.05–10 (f) and (g).

(b) Shifting boards in tonnage openings shall be of approved incombustible materials.

§ 72.05–40 *Heat and refrigeration insulation.* (a) Heat insulation on bulkheads, decks and ventilation ducts for other than cold or alternating hot or cold service and any materials incidental to its installation shall be of approved incombustible materials.

(b) Refrigeration insulation on bulkheads, decks, and ventilation ducts for cold or alternately hot or cold service and the material incidental to its installation need not be incombustible. However, any material of greater combustibility than cork board shall not be permitted.

§ 72.05–45 *Paint.* (a) An excessive number of coats of paint will be discouraged unless noncombustible paint is used.

(b) Nitrocellulose or other highly flammable or noxious fume-producing paints or lacquers shall not be used.

§ 72.05–50 *Ventilation.* (a) Where the term "duct" is used in this section, it shall include trunks, plenums, and any other type of ventilation piping, chambers, or duct work.

(b) Where automatic fire dampers are required, they shall be designed to operate at approximately 165 degrees F. for normal locations, and approximately 212 degrees F. for locations such as galleys. The dampers shall be so designed as to close against the anticipated draft in the duct. The damper shall be made accessible for periodic inspection by means of a hinged or bolted plate in the duct. The damper and the portion of duct containing the damper shall be constructed of at least ⅛ inch steel plate suitably stiffened. No insulation need be applied to the damper blade.

(c) Where ventilation ducts are required to meet bulkhead requirements, the space within the duct shall be considered to be the same as the space served by the ventilator, and the duct shall be insulated to meet the applicable requirements of Tables 72.05–10 (d) and (e).

(d) All ventilation systems shall be designed, where practicable, so that all ducts leading to the various enclosures are kept within the main vertical zones. No duct may serve spaces in more than one main vertical zone.

(e) Where of necessity ducts pass through main vertical zone bulkheads, automatic fire dampers shall be fitted adjacent to the bulkhead. The duct between the bulkhead and the damper shall meet the applicable bulkhead requirements. The damper shall be fitted with a visible indicator showing whether the damper is opened or closed. The dampers shall be capable of being manually closed from positions on both sides of the bulkhead. Such operating positions shall be marked as required by § 78.47–53.

(f) Vent ducts serving stairway enclosures shall serve no other spaces.

(g) Ventilation ducts serving cargo or machinery spaces which pass through accommodation spaces or safety areas shall be fitted with an automatic fire damper adjacent to the point of entry. Between the bulkhead or deck and the damper, and in addition, on vertical ducts for a distance of 6 feet above the damper, the duct shall meet the applicable bulkhead requirements.

(h) Exhausts from galleys shall meet the applicable bulkhead requirements. In addition, an automatic damper shall be installed in exhaust ducts over frying vats, etc.

(i) Where nitrocellulose film is used, motion picture projection rooms shall be equipped with mechanical ventilation to the open air to produce a complete change of air every 3 minutes. The air inlets shall be at the bottom of the space

and the mechanical exhaust shall be as near the top as practicable with the exception that a 6-inch duct shall be led directly over the lamp housing of each projector. The ventilation ducts outside the projection rooms shall meet the applicable bulkhead requirements.

(j) Where nitrocellulose film is used, film storage lockers shall have an outlet to the open air with a total area of at least 1 square inch for each 5 pounds of film for which there is storage space. The duct shall meet the bulkhead requirements.

(k) In all ventilation systems, manually operated dampers or other suitable means shall be provided in accessible locations for shutting off the passage of air in the event of fire; however, no dampers shall be placed in exhaust ducts from film lockers or projection rooms.

(l) For information regarding controls of electrically powered ventilation systems, see Subchapter J (Electrical Engineering) of this chapter.

§ 72.05–55 *Furniture and furnishings.* (a) For the purpose of this subpart, rooms containing "fire resistant furnishings" will be considered to be those in which:

(1) All case furniture such as desks, wardrobes, dressing tables, bureaus, dressers, etc., shall be constructed entirely of approved incombustible materials; except that a combustible veneer not exceeding ⅛ inch may be used on the top surface of such articles.

(2) All free standing furniture such as chairs, sofas, tables, etc., shall be constructed with frames of approved incombustible materials.

(3) All draperies and upholstery shall be of approved fire resistant fabrics.

(4) All rugs and carpets shall be of wool or other material having equivalent fire resistive qualities.

(b) Waste paper baskets shall be constructed of approved incombustible materials with solid sides and bottoms.

(c) Passageways and stairway inclosures shall contain only fire resistant furnishings.

§ 72.05–60 *Motion picture projection and equipment.* (a) When nitrocellulose film is used, the requirements of this paragraph shall be met.

§ 72.05–60 (a) (1) All projection equipment shall be operated from a projection room which shall be constructed in accordance with Tables 72.05–10 (d) through (g) and shall be ventilated in accordance with § 72.05–50 (i). Doors to projection rooms shall be of the self-closing type. All openings in the room for projection and operation shall be fitted with steel shutters so arranged as to be operable both manually and by means of fusible links.

(2) Film shall be normally stowed in a film stowage room constructed in accordance with Tables 72.05–10 (d) through (g) and shall be ventilated in accordance with § 72.05–50 (j). Sufficient film for one showing may be temporarily kept in the projection room, but should be returned to the film stowage room at the end of the performance.

(3) Projectors shall be of an approved type.

(b) When acetate or slow-burning film is used, the requirements of this paragraph shall be met.

(1) Projection rooms and special film stowage rooms are not required.

(2) Projectors shall be of an approved type.

§ 72.05–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels of less than 100 gross tons on an international voyage, whose construction, material alteration, or conversion to passenger vessel was contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing structure, arrangements, and materials previously approved will be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

(2) Internal combustion engine exhausts, boilers, galley uptakes, and similar sources of ignition shall be kept clear of and suitably insulated from any woodwork or other combustible matter.

(b) Vessels of 100 gross tons and over, whose construction, material alteration, or conversion to passenger vessel was contracted for on or before May 27, 1936, shall meet the following requirements:

(1) Existing structure, arrangements, and materials previously approved will be considered satisfactory so long as they meet the minimum requirements of this paragraph and are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original construction.

(2) Internal combustion engine exhausts, boiler and galley uptakes, and similar sources of ignition shall be kept clear of and suitably insulated from any woodwork or other combustible matter.

(3) Lamp, paint, and oil lockers and similar compartments shall be constructed of steel or shall be wholly lined with metal.

(4) All vessels in ocean or coastwise service shall be fitted above the bulkhead deck with fire resisting bulkheads and doors spaced not more than 131 feet apart which are capable of resisting the passage of flame for a period of at least 1 hour.

(5) All vessels with berth or stateroom accommodations for 50 or more passengers shall be fitted with an approved automatic sprinkling system unless deemed unnecessary by the Commandant. This system shall be so installed as to protect all enclosed parts of the vessel accessible to passengers or crew while the vessel is being navigated, except cargo holds, machinery spaces, and when of fire-resisting construction, toilets, bathrooms, and spaces of similar construction. Where, in the case of particular vessel, the Commandant does not consider the installation of an automatic water-sprinkling system necessary, such vessel shall be protected in such enclosed parts of the vessel as the Commandant shall deem necessary, with an automatic electric or pneumatic fire-detecting and alarm system, used singly or in combination, of a type approved by the Commandant.

(c) Vessels of 100 gross tons and over, whose construction, material alteration, or conversion to passenger vessel was contracted for after May 27, 1936, but before November 19, 1952, shall meet the following requirements:

(1) Existing structure, arrangements, and materials previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. As these vessels were constructed in general agreement with the requirements of §§ 72.05–5 through 72.05–60, minor repairs and alterations shall meet the requirements of §§ 72.05–5 through 72.05–60 where practicable.

SUBPART 72.10—MEANS OF ESCAPE

§ 72.10–1 *Application.* (a) The provisions of this subpart, with the exception of § 72.10–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 72.10–90.

§ 72.10–5 *Two means required.* (a) There shall be at least two means of escape from all general areas accessible to the passengers or where the crew may be quartered or normally employed. At least one of these two means of escape shall be independent of watertight doors.

§ 72.10–10 *Location.* (a) The two means of escape shall be as remote as practicable so as to minimize the possibility of one incident blocking both escapes.

§ 72.10–15 *Vertical ladders not acceptable.* (a) Vertical ladders and deck scuttles shall not in general be considered satisfactory as one of the required means of escape. However, where it is demonstrated that the installation of a stairway would be impracticable, a vertical ladder may be used as the second means of escape.

§ 72.10–20 *No means for locking door.* (a) No means shall be provided for locking doors giving access to either of the 2 required means of escape, except that crash doors or locking devices, capable of being easily forced in an emergency, may be employed provided a permanent and conspicuous notice to this effect is attached to both sides of the door. This paragraph shall not apply to outside doors to deckhouses where such doors are locked by key only and such key is under the control of one of the vessel's officers.

§ 72.10–25 *Stairway size.* (a) Stairways shall be of sufficient width having in mind the number of persons having access to such stairs for escape purposes. For stairway continuity and general requirements for stairways on vessels of 100 gross tons and over or any vessel on an international voyage, see § 72.05–20.

§ 72.10–30 *Dead end corridors.* (a) Dead end corridors, or the equivalent, more than 40 feet in length shall not be permitted.

§ 72.10–35 *Public spaces.* (a) In all cases, public spaces having a deck area

of over 300 square feet shall have at least two exists. Where practicable, these exists shall give egress to different corridors, rooms, or spaces to minimize the possibility of one incident blocking both exists.

§ 72.10–40 *Access to lifeboats.* (a) The stairways, corridors, and doors shall be so arranged as to permit a ready and direct access to the various lifeboat embarkation areas.

§ 72.10–45 *Weather deck communications.* (a) Vertical communication shall be provided between the various weather decks by means of permanent inclined ladders.

§ 72.10–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing arrangements previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original design provided that in no case will a greater departure from the standards of §§ 72.10–5 through 72.10–45 be permitted than presently exists. Nothing in this paragraph shall be construed as exempting any vessel from having 2 suitable means of escape from all main compartments which are accessible to the passengers or where the crew are normally quartered or employed.

SUBPART 72.15—VENTILATION

§ 72.15–1 *Application.* (a) The provisions of this subpart with the exception of § 72.15–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 72.15–90.

§ 72.15–5 *Structural fire protection.* (a) See § 72.05–50 for ventilation requirements on vessels of 100 gross tons and over or vessels of any tonnage on an international voyage, pertaining to structural fire protection.

§ 72.15–10 *Vessels using fuel having a flash point of 110 degrees F. or lower.* (a) Where liquid fuel having a flash point of 110 degrees F. or lower is used for main or auxiliary machinery or for starting purposes, the spaces containing such machinery or fuel tanks shall have natural supply and mechanical ventilation as required by this section.

(b) The requirements for the mechanical exhaust system shall be such as to assure the air changes as noted in Table 72.15–10 (b), depending upon the size of the space.

TABLE 72.15–10 (b)

Size of space, cubic feet		Minutes per air change
Over	Not over	
---	500	2
500	1,000	3
1,000	1,500	4
1,500	---	8

(c) Exhaust blower motors shall be outside of the ducts, and if mounted in any compartment required to be ventilated by this section, shall be of the explosion proof type. Blower blades shall be non-sparking with reference to their housings.

(d) Exhaust blower switches shall be located outside of any space required to be ventilated by this section, and shall be of the type interlocked with the ignition switch so that the blowers are started before the engine ignition is switched on. A red warning sign at the switch shall state that the blowers shall be operated prior to starting the engines for a sufficient time to insure at least one complete change of air in the compartments.

(e) The area of the ducts shall be such as to limit the air velocity to a maximum of 2,000 feet per minute. Ducts may be of any shape, provided that in no case shall 1 dimension exceed twice the other.

(f) At least 2 inlet ducts shall be located at 1 end of the compartment and they shall extend to the lowest part of the compartment or bilge on each side. Similar exhaust ducts shall be led to the mechanical exhaust system from the lowest part of the compartment or bilge on each side of the compartment at the end opposite from that at which the inlet ducts are fitted.

(g) All ducts shall be constructed of non-ferrous metal or galvanized ferrous metal not less than No. 22 USSG, intact and gas tight from end to end and shall be of substantial construction. The ducts shall lead as direct as possible and be properly fastened and supported.

(h) All supply ducts shall be provided with cowls or scoops having a free area not less than twice the required duct area. When the cowls or scoops are screened, the mouth area shall be increased to compensate for the area of the screen wire. Dampers shall not be fitted in the supply ducts. Cowls or scoops shall be kept open at all times except when the stress of weather is such as to endanger the vessel if the openings are not temporarily closed. Supply and exhaust openings shall not be located where the natural flow of air is unduly obstructed, or adjacent to possible sources of vapor ignition, nor shall they be so located that exhaust air may be taken into the supply vents.

§ 72.15–15 *Ventilation for closed spaces.* (a) All enclosed spaces within the vessel shall be properly vented or ventilated. Means shall be provided to close off all vents and ventilators.

§ 72.15–20 *Ventilation for crew quarters and passenger spaces.* (a) All crew and passenger spaces shall be adequately ventilated in a manner suitable to the purpose of the space.

(b) On vessels of 100 gross tons and over, except for such spaces as are so located that under all ordinary conditions of weather, windows, ports, skylights, etc., and doors to passageways can be kept open, all crew spaces shall be ventilated by a mechanical system, unless it can be shown that a natural system will provide adequate ventilation. However, vessels which trade regularly in the tropics shall, in general, be fitted with a mechanical ventilation system.

§ 72.15–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing arrangements previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original design provided that in no case will a greater departure from the standards of §§ 72.15–5 through 72.15–20 be permitted than presently exists.

SUBPART 72.20—ACCOMMODATIONS FOR OFFICERS AND CREW

§ 72.20–1 *Application.* (a) The provisions of this subpart, with the exception of § 72.20–90, shall apply to all vessels of 100 gross tons and over contracted for on or after November 19, 1952. Vessels of 100 gross tons and over contracted for prior to November 19, 1952, shall meet the requirements of § 72.20–90.

(b) Vessels of less than 100 gross tons shall meet the applicable requirements of this subpart insofar as is reasonable and practicable.

§ 72.20–5 *Intent.* (a) It is the intent of this subpart that the accommodations provided for officers and crew on all vessels shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, arranged, and where practicable, shall be insulated from undue noise and effluvia.

(b) The crew referred to in this subpart includes all persons, except the licensed officers, regularly employed on board any vessel. Where the requirements for the accommodations of licensed officers are not otherwise specified, they shall be at least equivalent to that indicated for the crew.

(c) For the purpose of this subpart, the term "crew spaces" shall include sleeping rooms, mess rooms, recreational rooms, toilet and shower spaces, etc., which are intended for the exclusive use of the crew.

§ 72.20–10 *Location of crew spaces.* (a) Crew spaces shall be located, where practicable, so that the maximum amount of fresh air and light are obtainable, having due regard to the service of the vessel and the requirements of other space users.

(b) Crew spaces shall not be located forward of the collision bulkhead, nor shall any section of the deck of such crew spaces be below the deepest load line, except that in special cases, such as large passenger vessels, the Commandant may approve such an arrangement: *Provided,* That in no case shall the deck head of the crew space be below the deepest load line.

(c) Hawse pipes or chain pipes shall not pass through crew spaces.

(d) There shall be no direct communication, except through solid, close fitted doors or hatches between crew spaces and chain lockers, cargo or machinery spaces.

(e) There shall be no access, vents, or sounding tubes from fuel or cargo oil tanks opening into crew spaces, except that sounding tubes and access openings may be located in corridors.

(f) Where practicable, crew spaces shall be located entirely separate and

independent of spaces allotted to passengers or licensed officers.

§ 72.20–15 *Construction.* (a) See subpart 72.05 for requirements on vessels of 100 gross tons and over or vessels of any tonnage on an international voyage pertaining to structural fire protection.

(b) All crew spaces are to be constructed in a manner suitable for the purpose for which they are intended. The bulkheads separating the crew space from cargo and machinery spaces, lamp and paint rooms, storerooms, drying rooms, washrooms, and toilet spaces shall be made odorproof where deemed necessary by the Commandant.

(c) Toilet spaces, except when provided as private or semiprivate facilities, shall be so built, fitted, and situated, that no odor from them will readily enter other crew spaces.

(d) Where shell or unsheathed weather decks form boundaries of crew spaces, suitable protective coverings shall be applied to prevent formation or accumulation of moisture.

(e) Where crew spaces adjoin or are immediately above spaces such as galleys, machinery spaces or casings, donkey boiler rooms, etc., they shall be suitably protected from the heat by approved insulation.

(f) The interior sides and deck heads of crew spaces shall be covered with enamel, paint, or other material light in color.

(g) Crew spaces shall be properly drained where considered necessary.

(h) All washrooms and toilet rooms shall be properly drained and so constructed and arranged that they can be kept in a clean, workable, and sanitary condition. The scuppers shall be located in the lowest part of the spaces, due consideration being given to the average trim of the vessel.

§ 72.20–20 *Sleeping accommodations*—(a) *Arrangements.* (1) Separate sleeping accommodations are to be provided for the deck, engine, and steward groups of the crew.

(2) Each watch of seamen, firemen, or similar ratings on duty in watches is to be provided with separate sleeping room or rooms unless the total space for accommodations makes this impracticable.

(3) Where practicable, each licensed officer shall be provided with a separate stateroom.

(b) *Size.* (1) Sleeping accommodations for the crew shall be divided into rooms, no one of which shall berth more than 4 persons, except that on passenger ships requiring a large personnel in the steward's department, rooms may be arranged to accommodate not more than 10 such persons.

(2) Each room shall be of such size that there are at least 30 square feet of deck area and a volume of at least 210 cubic feet for each person accommodated, except where more than four persons are berthed in one room, in which case the minimum may be 24 square feet of deck area and a volume of 168 cubic feet for each person. The clear head room shall be not less than 6 feet 3 inches. In measuring sleeping quarters allocated to crews of vessels, any equipment contained therein for the use of the occupants is not to be deducted from the total volume or from the deck area.

(c) *Equipment.* (1) Each person shall have a separate berth and not more than 1 berth shall be placed above another. The berths shall have a framework of metal or other hard, smooth material not likely to corrode or harbor vermin, and shall be so arranged that they provide ample room for easy occupancy. The over-all size of a berth shall not be less than 30 inches wide by 76 inches long, except by special permission of the Commandant. Where berths adjoin, they shall be divided by a partition not less than 18 inches in height. Where 2 tiers of berths are fitted, the bottom of the lower must not be less than 12 inches above the deck, and the bottom of the upper must not be less than 2 feet 6 inches both from the bottom of the lower and from the deck overhead. The berths shall not be obstructed by pipes, ventilating ducts, or other installations.

(2) A locker of metal or other hard, smooth material shall be provided for each person accommodated in a room. Each locker shall be not less than 300 square inches in cross section area and 60 inches high. It shall be so placed as to be readily accessible. The interior of the locker shall be so ararnged as to facilitate the proper stowage of clothes.

§ 72.20–25 *Washrooms and toilet rooms.* (a) There shall be provided at least 1 toilet, 1 washbasin, and 1 shower or bathtub for each 8 members or portion thereof in the crew to be accommodated. The crew to be accommodated shall include all members who do not occupy rooms to which private or semiprivate facilities are attached.

(b) Under the following conditions, the toilet and washing facilities for the specific groups of the crew indicated shall be located in spaces separate from the facilities for other crew members; and shall be provided for that group in the ratios required by paragraph (a) of this section.

(1) The members of the engine department, where their number, exclusive of licensed officers, and others separately provided for, exceeds eight.

(2) The members of the steward's department, exclusive of those separately provided for, where their number exceeds eight.

(3) All female members of the crew.

(c) The toilet rooms and washrooms shall be located convenient to the sleeping quarters of the crew to which they are allotted but shall not open directly into such quarters except when they are provided as private or semiprivate facilities.

(d) All washbasins, showers, and bathtubs shall be equipped with proper plumbing, including hot and cold running water. Washbasins may be located in the crew sleeping quarters.

(e) The toilet rooms shall be separate from the washrooms and at least 1 washbasin shall be fitted in each toilet room, except where private or semiprivate facilities are provided and washbasins are installed in sleeping rooms.

(1) All toilets shall be installed with proper plumbing for flushing. Toilets shall be provided with seats of the open front type that automatically lift up when not in use. Urinals may be fitted in toilet rooms, if desired, but no reduction in the required number of toilets will be made therefor.

(2) Where more than one toilet is located in a space or compartment, each toilet shall be separated by partitions, which shall be open at the top and bottom for ventilation and cleaning purposes.

§ 72.20–30 *Messrooms.* (a) Messrooms shall be located as near to the galley or suitably equipped serving pantries as is practicable except where messroom is equipped with a steam table. The messrooms shall be of such size as to seat the number of persons normally scheduled to be eating at one time.

(b) Messrooms shall be properly equipped with tables, seats, and other necessary equipment and shall be so arranged as to permit easy access to each seat.

§ 72.20–35 *Hospital space.* (a) Each vessel, which in the ordinary course of its trade makes voyages of more than 3 days duration between ports and which carries a crew of 12 or more, shall be provided with a hospital space. This space shall be situated with due regard to the comfort of the sick so that they may receive proper attention in all weathers.

(b) The hospital shall be suitably separated from other spaces and shall be used for the care of the sick and for no other purpose.

(c) The entrance shall be of such width and in such a position as to admit a stretcher case readily. Berths shall be of metal and may be in double tier, provided the upper berth is hinged and arranged to be secured clear of the lower berth when not in use. At least one berth shall be so arranged that it can be made accessible from both sides when necessary.

(d) The hospital shall be fitted with berths in the ratio of 1 berth to every 12 members of the crew or portion thereof who are not berthed in single occupancy rooms, but the number of berths need not exceed 6.

(e) The hospital shall have a toilet, washbasin, and bathtub or shower conveniently situated. Other necessary suitable equipment of such character as clothes locker, table, seat, etc., shall be provided.

§ 72.20–40 *Other spaces.* (a) Sufficient facilities, depending upon the number of the crew, shall be provided where the crew may wash their own clothes. There shall be at least 1 tub or sink, fitted with the necessary plumbing, including hot and cold running water.

(b) Clothes drying facilities or space shall be provided for the needs of the crew.

(c) A space or spaces of adequate size shall be available on an open deck to which the crew has access when off duty.

(d) Recreation accommodations shall be provided. Where messrooms are used for this purpose, they shall be suitably planned.

§ 72.20–45 *Lighting.* (a) All crew spaces shall be adequately lighted in accordance with the requirements of Subchapter J (Electrical Engineering) of this chapter.

(b) Berth lights shall be provided for each member of the crew.

§ 72.20–50 *Heating.* (a) All crew spaces shall be adequately heated in a manner suitable to the purpose of the space.

(b) The heating system will be considered satisfactory if it is capable of maintaining a minimum temperature of 70 degrees F. under normal operating conditions without undue curtailment of the ventilation.

(c) Radiators and other heating apparatus shall be so placed, and where necessary shielded, as to avoid risk of fire or danger or discomfort to the occupants. Pipes leading to radiators or heating apparatus shall be lagged where the pipes create a hazard to persons occupying the space.

§ 72.20–55 *Insect screens.* (a) Except in such areas as are considered to be insect free, provisions shall be made to protect the crew quarters against the admission of insects. This may be accomplished by the fitting of suitable screens to ventilating skylights, air ports, ventilators, and doors to unscreened spaces and the open deck, or by other methods.

§ 72.20–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels of less than 100 gross tons, contracted for prior to November 19, 1952, shall meet the general intent of § 72.20–5 and in addition shall meet the following requirements:

(1) Existing structure, arrangements, materials, and facilities, previously accepted or approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made of the same standard as the original construction.

(b) Vessels of 100 gross tons and over, contracted for prior to March 4, 1915, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction provided that in no case will a greater departure from the standards of §§ 72.20–5 through 72.20–55 be permitted than presently exists.

(c) Vessels of 100 gross tons and over, contracted for on or after March 4, 1915, but prior to January 1, 1941, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously accepted or approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

(2) Where reasonable and practicable, a minimum of 1 toilet, shower, and washbasin shall be provided for each 10 members of the crew or fraction thereof.

(3) Crew spaces shall have a volume of at least 120 cubic feet and a deck area of at least 16 square feet for each person accommodated.

(4) Each crew member shall have a separate berth, and berths may not be placed more than two high.

(5) Each vessel, which in the ordinary course of its trade makes a voyage of more than 3 days' duration between ports and which carries a crew of 12 or more persons, shall be provided with a suitable hospital space for the exclusive use of the sick or injured. Berths shall be provided in the ratio of 1 berth for each 12 members of the crew or fraction thereof, but the number of berths need not exceed 6.

(6) The crew spaces shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, and arranged, and where practicable shall be insulated from undue noise and effluvia.

(d) Vessels of 100 gross tons and over, contracted for on or after January 1, 1941, but prior to November 19, 1952, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously accepted or approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

(2) Washrooms and toilet rooms:

(i) There shall be a minimum of one toilet, shower, and washbasin for each eight members of the crew or fraction thereof who are not accommodated in rooms having attached private or semi-private facilities.

(ii) Separate facilities shall be provided for the engine room, deck, or stewards' department when the number of crew in that department, exclusive of officers, exceeds eight.

(iii) Toilet rooms shall be separate from the washrooms. At least one washbasin shall be installed in each toilet room.

(iv) Toilets shall be provided with seats of the open front type that automatically lift up when not in use. Urinals may be fitted in toilet rooms if desired, but no reduction will be made in the required number of toilets.

(v) Washbasins, showers, and bathtubs if substituted for showers, shall be equipped with proper plumbing, including hot and cold running water.

(3) Crew spaces shall have a volume of at least 120 cubic feet and a deck area of at least 16 square feet for each person accommodated.

(4) Each crew member shall have a separate berth, and berths may not be placed more than two high.

(5) Each vessel, which in the ordinary course of its trade makes a voyage of more than 3 days' duration between ports and which carries a crew of 12 or more persons, shall be provided with a suitable hospital space for the exclusive use of the sick or injured. Berths shall be provided in the ratio of 1 berth for each 12 members of the crew or fraction thereof, but the number of berths need not exceed 6.

(6) The crew spaces shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, and arranged, and where practicable shall be insulated from undue noise and effluvia.

SUBPART 72.25—PASSENGER ACCOMMODATIONS

§ 72.25–1 *Application.* (a) The provisions of this subpart shall apply to all vessels.

§ 72.25–5 *Steerage passengers.* (a) Where the total area provided for the exclusive use of a class of passengers is less than 36 square feet per passenger, the provisions of the Steerage Passenger Act of August 2, 1882, as amended, 46 U. S. C. 151, which is administered and enforced by the Bureau of Customs, shall be complied with. For the purpose of computing the number of passengers, children under 1 year of age shall not be counted, and two children between the ages of one and eight shall be counted as one passenger.

§ 72.25–10 *Location of passenger quarters.* (a) The deck forming the deckhead of passenger quarters between adjacent watertight bulkheads shall not be below the deepest load line at any point within the watertight compartment in question.

§ 72.25–15 *Passenger accomodations for excursion boats, ferryboats, and passenger barges.* (a) Except as specifically excluded by this section, separate public toilet spaces shall be provided for male and female passengers with at least the minimum equipment in each based upon the number of passengers permitted to be carried as set forth in Table 72.25–15 (a).

TABLE 72.25–15 (a)

Number of passengers		Toilets	Washbasins
Over	Not over		
----	100	1	1
100	300	2	1
300	500	3	2
500	1,000	4	2
1,000	1,500	5	3
1,500	2,000	6	3
2,000	2,500	7	4
2,500	3,000	8	4
3,000	3,500	9	5
3,500	4,000	10	5
4,000	---------	(1)	(1)

[1] Additional facilities by extrapolation.

(b) In the men's spaces, urinals may be substituted for toilets, provided at least one-half the required toilets are fitted.

(c) On ferry boats and barges having a short run, passenger toilet facilities need not be fitted.

SUBPART 72.40—RAILS AND GUARDS

§ 72.40–1 *Application.* (a) The provisions of this subpart, with the exception of § 72.40–90, shall apply to all vessels.

§ 72.40–5 *Where rails required.* (a) Rails or equivalent protection shall be installed near the periphery of all weather decks accessible to passengers or crew. The height and construction of such rails shall be as required by this section.

(b) Such rails on decks accessible to passengers shall be in at least three courses approximately evenly spaced, and shall be at least 42 inches high, except:

(1) On vessels of 65 feet in length or less, other than ferry boats, excursion vessels, and vessels of a similar type where large numbers of passengers are carried, such rails may be 36 inches high.

(2) Where the height of the rails interferes with the business of the vessel, as in the case of a sport fishing vessel, special permission may be granted by the Commandant to install rails not less than 36 inches high.

(3) On the passenger decks of ferry boats and excursion vessels, the space below the top of the rail shall be fitted with suitable wire mesh or the equivalent. Depending upon the type of construction, the lower rail courses may not be required.

(c) All other such rails shall be at least 36 inches high and shall be in at least two courses.

§ 72.40–10 *Storm rails.* (a) Suitable storm rails shall be installed in all passageways and at the deck-house sides where passengers or crew might have normal access. Storm rails shall be installed on both sides of passageways which are 6 feet or more in width.

§ 72.40–15 *Vehicular ferries.* (a) On vehicular ferries, suitable chains, cables, or other barriers shall be installed at the ends of the vehicle runways. In addition, suitable gates, rails, or other devices shall be installed as a continuation of the regularly required rails.

§ 72.40–20 *Guards in dangerous places.* (a) Suitable covers, guards, or rails shall be installed in way of all exposed and dangerous places such as gears, machinery, etc.

§ 72.40–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing structure, arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original construction provided that in no case will greater departure from the standards of §§ 72.40–5 through 72.40–20 be permitted than presently exists.

PART 73—WATERTIGHT SUBDIVISION

Chapter I is amended by adding a new Part 73 to Subchapter H reading as follows:

SUBPART 73.01—APPLICATION

Sec.
73.01–1 General.

SUBPART 73.05—DEFINITIONS

73.05–1 Subdivision load line.
73.05–2 Deepest subdivision load line.
73.05–3 Length of the vessel.
73.05–4 Breadth of the vessel.
73.05–5 Bulkhead deck.
73.05–6 Margin line.
73.05–7 Draft.
73.05–8 Permeability.
73.05–9 Volume.
73.05–10 Machinery space.
73.05–11 Passenger spaces.
73.05–12 Floodable length.

SUBPART 73.10—RULES FOR SUBDIVISION—VESSELS ON INTERNATIONAL VOYAGES AND VESSELS OF 150 GROSS TONS AND OVER IN OCEAN OR COASTWISE SERVICE

73.10–1 General.
73.10–5 Permeability.
73.10–10 Factor of subdivision.
73.10–15 Criterion of service.
73.10–20 Formulas for factor of subdivision.
73.10–25 Stepped bulkhead decks.
73.10–30 Compartment exceeding permissible length.
73.10–35 Additional subdivision at forward end.
73.10–40 Stepped bulkheads.
73.10–45 Recessed bulkheads.
73.10–50 Equivalent plane bulkheads.
73.10–55 Minimum spacing of bulkheads.
73.10–60 Allowances for local subdivision.

SUBPART 73.15—RULES FOR SUBDIVISION—VESSELS IN SERVICES OTHER THAN OCEAN OR COASTWISE AND VESSELS UNDER 150 GROSS TONS IN OCEAN OR COASTWISE SERVICE AND NOT ON AN INTERNATIONAL VOYAGE

73.15–1 Permeability.
73.15–5 Compartmentation of all vessels other than ferry vessels.
73.15–10 Compartmentation of ferry vessels.
73.15–15 Minimum spacing of bulkheads.
73.15–20 Stepped bulkheads.
73.15–25 Recessed bulkheads.
73.15–30 Equivalent plane bulkheads.

SUBPART 73.20—PEAK AND MACHINERY SPACE BULKHEADS, SHAFT TUNNELS

73.20–1 Collision bulkhead.
73.20–5 Machinery space bulkheads.
73.20–10 After peak bulkhead.
73.20–15 Shaft tunnels.

SUBPART 73.25—DOUBLE BOTTOMS

73.25–1 Application.
73.25–5 Extent of double bottoms.
73.25–10 Wells in double bottoms.
73.25–15 Manholes in double bottoms.
73.25–20 Watertight floors in double bottoms.

SUBPART 73.30—PENETRATIONS AND OPENINGS IN WATERTIGHT BULKHEADS

73.30–1 General.
73.30–5 Pipes, cables, etc.
73.30–10 Valves and cocks.
73.30–15 Prohibited locations for access openings.
73.30–20 Pipes through collision bulkhead.
73.30–25 Watertight door limitations.
73.30–30 Trunkways or tunnels.
73.30–35 Portable plates.
73.30–40 Openings above margin line.

SUBPART 73.35—WATERTIGHT BULKHEAD DOORS

73.35–1 Types and classes.
73.35–5 Class 1 doors, permissible locations.
73.35–10 Class 2 doors, permissible locations.
73.35–15 Class 3 doors, permissible locations.
73.35–20 Door operating requirements.
73.35–25 Door indicators and warning signals.
73.35–30 Doors, design, installation, and tests.

SUBPART 73.40—OPENINGS IN VESSEL'S SIDES BELOW THE BULKHEAD DECK

73.40–1 General.
73.40–5 Port lights.
73.40–10 Automatic ventilators.
73.40–15 Side ports.
73.40–20 Piping openings in vessel's sides.

SUBPART 73.45—OPENINGS ABOVE THE BULKHEAD DECK

Sec.
73.45–1 General.

SUBPART 73.90—VESSELS CONTRACTED FOR PRIOR TO NOVEMBER 19, 1952

73.90–1 Requirements.

AUTHORITY: §§ 73.01–1 to 73.90–1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4490, as amended, sec. 3, 24 Stat. 129, 41 Stat. 305, sec. 2, 45 Stat. 1493, sec. 2, 49 Stat. 888, sec. 5, 49 Stat. 1384, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 846, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 482, 483, 363, 85a, 88a, 869, 367, 1333, 50 U. S. C. App. 1275.

SUBPART 73.01—APPLICATION

§ 73.01–1 *General.* (a) The provisions of this part, with the exception of Subpart 73.90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to that date shall meet the requirements of Subpart 73.90.

SUBPART 73.05—DEFINITIONS

§ 73.05–1 *Subdivision load line.* The subdivision load line is the waterline used to determine the subdivision of the ship.

§ 73.05–2 *Deepest subdivision load line.* The deepest subdivision load line is the waterline which corresponds to the greatest draft.

§ 73.05–3 *Length of the vessel.* The length of the vessel is the length measured between perpendiculars taken at the extremities of the deepest subdivision load line.

§ 73.05–4 *Breadth of the vessel.* The breadth of the vessel is the extreme width from outside of frame to outside of frame at or below the deepest subdivision load line. On wood vessels, measurements should be taken to outside of planking.

§ 73.05–5 *Bulkhead deck.* The bulkhead deck is the uppermost deck up to which the transverse watertight bulkheads are carried.

§ 73.05–6 *Margin line.* (a) The margin line is a line drawn at least 3 inches below the upper surface of the bulkhead deck at side where the bulkhead deck is continuous; where the bulkhead deck is not continuous, an assumed continuous margin line shall be used which at no point is less than 3 inches below the top of the deck at side to which the bulkheads concerned and the shell are carried watertight.

(b) In the case of vessels with continuous bulkhead decks, where the mean of the maximum sheer forward and aft is less than 12 inches, a modified margin line 3 inches below the top of the deck at the ends but lowered throughout its length so as to have a mean parabolic sheer of 12 inches is to be used. Where the bulkhead deck is not continuous, the margin line shall be such as to give at least a standard of safety equivalent to the foregoing.

§ 73.05–7 *Draft.* The draft is the vertical distance from the molded base

line amidships to the subdivision load line in question.

§ 73.05–8 *Permeability.* The permeability of a space is the percentage of that space which can be occupied by water.

§ 73.05–9 *Volume.* The volume of a space which extends above the margin line shall be measured only to the height of that line. In all cases, volumes shall be calculated to molded lines; linear dimensions are to be taken in feet and volumes in cubic feet.

§ 73.05–10 *Machinery space.* The machinery space is to be taken as extending from the molded base line to the margin line and between the extreme main transverse watertight bulkheads bounding the spaces devoted to the main and auxiliary propelling machinery, boilers when installed, and all permanent coal bunkers. In the case of unusual arrangements, the Commandant may define the limits of the machinery spaces.

§ 73.05–11 *Passenger spaces.* Passenger spaces are those which are provided for the accommodation and use of passengers, excluding baggage, store, provision and mail rooms. For the purpose of §§ 73.10–5 and 73.10–15, spaces provided below the margin line for the accommodation and use of the crew shall be regarded as passenger spaces.

§ 73.05–12 *Floodable length.* The floodable length at a given point in the length of the vessel is the maximum portion of the length of the vessel, having its center at the point in question, which can be flooded without the vessel being submerged beyond the margin line. The floodable length at any point in the length of the vessel shall be determined by a method of calculation which takes into consideration the form, draft and other characteristics of the vessel, and based on the definite assumptions of permeability as set forth in §§ 73.10–5 or 73.15–1.

SUBPART 73.10—RULES FOR SUBDIVISION—VESSELS ON INTERNATIONAL VOYAGES AND VESSELS OF 150 GROSS TONS AND OVER IN OCEAN OR COASTWISE SERVICE

§ 73.10–1 *General.* (a) Vessels shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the length of the vessel and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest length, primarily engaged in the carriage of passengers.

§ 73.10–5 *Permeability*—(a) *General.* In determining the floodable length, a uniform average permeability shall be used throughout the whole length of each of the following portions of the vessel below the margin line:

(1) The machinery space.

(2) The portion forward of the machinery space.

(3) The portion aft of the machinery space.

(b) *Machinery space.* (1) For steam vessels, the uniform average permeability throughout the machinery space shall be determined from the formula:

$$80 \text{ plus } 12.5\,\frac{(a-c)}{v} \qquad (1)$$

where:

a = volume of the passenger spaces, as defined in § 73.05–11, which are situated below the margin line within the limits of the machinery space.

c = volume of between deck spaces below the margin line within the limits of the machinery space which are appropriated to cargo, coal, or stores.

v = whole volume of the machinery space below the margin line.

(2) For vessels propelled by internal combustion engines, the uniform average permeability shall be taken as five greater than that given by the above formula.

(3) Where it is shown to the satisfaction of the Commandant, U. S. Coast Guard, that the average permeability, as determined by detailed calculation, is less than that given by the formula, the calculated value may be substituted. For the purposes of such calculation, the permeabilities of passenger spaces, as defined in § 73.05–11 shall be taken as 95, that of all cargo, coal, and store spaces as 60, and that of double-bottom, oil-fuel, and other tanks at such values as may be approved in each case by the Commandant.

(c) *Portion forward and aft of machinery space.* (1) The uniform average permeability throughout the portion of the vessel before or abaft the machinery space shall be determined from the formula:

$$63 \text{ plus } 35\,\frac{a}{v} \qquad (2)$$

where:

a = volume of the passenger spaces, as defined in § 73.05–11, which are situated below the margin line before or abaft the machinery space.

v = whole volume of the portion of the vessel below the margin line before or abaft the machinery space.

(d) *Other arrangements.* (1) In the case of unusual arrangements, the Commandant may allow, or require, a detailed calculation of verage permeability for the portions before or abaft the machinery spaces. For the purpose of such calculations, the permeability of passenger spaces as defined in § 73.05–11, shall be taken as 95, that of spaces containing machinery as 80, that of all cargo, coal, and store spaces as 60, and that of double bottoms, oil fuel, and other tanks at such values as may be approved in each case by the Commandant.

(e) *'Tween deck compartment.* (1) If a 'tween deck compartment between two watertight transverse bulkheads contains any passenger or crew space, the whole of that compartment, less any space completely enclosed within permanent steel bulkheads and appropriated to other purposes, shall be regarded as passenger space. If, however, the passenger or crew space in question is completely enclosed with permanent steel bulkheads, only the space so enclosed need be considered as passenger space.

§ 73.10–10 *Factor of subdivision.* (a) The maximum permissible length of a compartment having its center at any point in the vessel's length is obtained from the floodable length by multiplying the latter by an appropriate factor called the factor of subdivision.

(b) The factor of subdivision shall depend on the length of the vessel, and for a given length shall vary according to the nature of the service for which the vessel is intended. It shall decrease in a regular and continuous manner as the length of the vessel increases, and from a factor A, applicable to vessels primarily engaged in the carriage of cargo, to a factor B applicable to vessels primarily engaged in the carriage of passengers.

(1) The variations of the factors A and B shall be expressed by the following formulas where L is the length of the vessel in feet as defined in § 73.05–3:

$$A=\frac{190}{L-160} \text{ plus } 0.18 \ (L=392 \text{ and upward}) \qquad (1)$$

$$B=\frac{94}{L-85} \text{ plus } 0.18 \ (L=200 \text{ and upward}) \qquad (2)$$

§ 73.10–15 *Criterion of service.* (a) For a vessel of given length the appropriate factor of subdivision shall be determined by the Criterion of Service Numeral (hereinafter called the "Criterion Numeral") as given by the following formula:

$$C_s=60\frac{M+2P}{V}+30{,}000\frac{N}{L^2} \qquad (1)$$

where:

C_s = the Criterion Numeral.

L = length of the vessel in feet, as defined in § 73.05–3.

M = the volume of the machinery space, as defined in § 73.05–10, with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and before or abaft the machinery space.

P = the whole volume of the passenger spaces below the margin line, as defined in § 73.05–11.

V = the whole volume of the vessel below the margin line.

N = number of passengers for which the vessel is to be certificated.

§ 73.10–20 *Formulas for factor of subdivision.* (a) The subdivision abaft the fore peak of vessels 392 feet or more in length having a Criterion Numeral of 23 or less shall be governed by the factor A given by § 73.10–10 (b) (1), of those having a Criterion Numeral of 123 or more by the factor B given by § 73.10–10 (b) (1); and of those having a Criterion Numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and B, using the formula:

$$F=A-\frac{(A-B)\times(C_s-23)}{100} \qquad (1)$$

(b) The subdivision abaft the fore peak of vessels less than 392 feet, but not less than 200 feet in length, and having a Criterion Numeral equal to S, where

$$S=\frac{20904-25L}{48} \qquad (2)$$

shall be governed by the factor unity; of those having a Criterion Numeral of

123 or more by the factor B given by § 73.10–10 (b) (1); and of those having a Criterion Numeral between S and 123 by the factor obtained by linear interpolation between unity and the factor B, using the formula:

$$F=1-\frac{(1-B)\ (C_s-S)}{123-S} \qquad (3)$$

(c) The subdivision abaft the fore peak of vessels less than 392 feet, but not less than 200 feet, in length and having a Criterion Numeral less than S, and of all ships less than 200 feet in length shall be governed by the factor unity, unless it is shown to the satisfaction of the Commandant to be impracticable to comply with this factor in any part of the vessel, in which case the Commandant may allow such relaxation as may appear to be justified having regard to all the circumstances.

§ 73.10–25 *Stepped bulkhead decks.* (a) Where in a portion or portions of a vessel the watertight bulkheads are carried to a higher deck than in the remainder of the vessel, and it is desired to take advantage of this higher extension of the bulkheads in calculating the floodable length, separate margin lines may be used for each such portion of the ship provided:

(1) The sides of the vessel extend throughout the vessel's length to the deck corresponding to the upper margin line and all openings in the shell plating below this deck throughout the length of the vessel meet the conditions for side openings below the margin line.

(2) The two compartments adjacent to the "step" in the bulkhead deck shall each be within the permissible length corresponding to their respective margin lines and, in addition, their combined length, shall not exceed twice the permissible length based on the lower margin line.

§ 73.10–30 *Compartment exceeding permissible length.* (a) A compartment may exceed the permissible length determined by this subpart provided the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.

(b) If one of the two adjacent compartments is situated inside the machinery space, and the second is situated outside the machinery space, and the average permeability of the portion of the vessel in which the second is situated differs from that of the machinery space, the combined length of the two compartments shall be adjusted to the mean average permeability of the two portions of the vessel in which the compartments are situated.

§ 73.10–35 *Additional subdivision at forward end.* (a) In vessels 392 feet in length and upward, one of the main transverse bulkheads abaft the fore peak shall be fitted at a distance from the forward perpendicular which is not greater than the permissible length.

§ 73.10–40 *Stepped bulkheads.* (a) A main transverse bulkhead may be stepped provided that it meets one of the following conditions:

(1) The combined length of the two compartments, separated by the bulkhead in question, does not exceed either 90 percent of the floodable length or twice the permissible length, except that in ships having a factor of subdivision greater than .9, the combined length of the two compartments in question shall not exceed the permissible length.

(2) Additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead.

(3) The compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 3 inches below the step.

§ 73.10–45 *Recessed bulkheads.* (a) A main transverse bulkhead may be recessed provided that all parts of the recess lie inboard of vertical surfaces on both sides of the vessel, situated at a distance from the shell plating equal to one-fifth the breadth of the vessel, as defined in § 73.05–4, and at right angles to the center line at the level of the deepest subdivision load line. Any part of a recess which lies outside these limits shall be dealt with as a step in accordance with § 73.10–40.

§ 73.10–50 *Equivalent plane bulkheads.* (a) Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.

§ 73.10–55 *Minimum spacing of bulkheads.* (a) If the distance between two adjacent main transverse bulkheads, or their equivalent plane bulkheads, or the distance between the transverse planes passing through the nearest stepped portions of the bulkheads, is less than 10 feet plus 3 percent of the length of the vessel, or 35 feet whichever is less, only one of these bulkheads shall be regarded as forming a part of the subdivision of the vessel in accordance with the provisions of this subpart and for the application of damaged stability requirements contained in § 74.10–15.

§ 73.10–60 *Allowances for local subdivision.* (a) Where a main transverse watertight compartment contains local subdivision, and it can be shown to the satisfaction of the Commandant that, after any assumed side damage extending over a length equal to the minimum spacing of bulkheads set forth in § 73.10–55, the whole volume of the main compartment will not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment. In such a case the volume of effective buoyancy assumed on the undamaged side shall not be greater than that assumed on the damaged side.

SUBPART 73.15—RULES FOR SUBDIVISION—VESSELS IN SERVICES OTHER THAN OCEAN OR COASTWISE AND VESSELS UNDER 150 GROSS TONS IN OCEAN OR COASTWISE SERVICE AND NOT ON AN INTERNATIONAL VOYAGE

§ 73.15–1 *Permeability.* (a) In making subdivision calculations, volumes shall be calculated to the margin line, and the permeability of spaces shall be taken as follows:

(1) Machinery spaces at 85 percent.

(2) Tanks, chain lockers, and spaces normally filled with cargo, stores, mail, or baggage in the full load condition at 60 percent.

(3) All other spaces at 95 percent.

§ 73.15–5 *Compartmentation of all vessels other than ferry vessels.* (a) Every mechanically propelled vessel whether or not specifically required by this section to meet at least a one-compartment standard of subdivision shall be fitted as follows:

(1) With not less than three transverse watertight bulkheads, or

(2) If in Great Lakes or limited coastwise service not more than 15 miles from the mouth of bays or harbors, with a collision bulkhead and with sufficient air tankage or other internal buoyancy to float the vessel when completely flooded, or

(3) If in lakes, bays and sounds or river service, with sufficient air tankage or other internal buoyancy to float the vessel when completely flooded.

(4) The use of internal buoyancy shall not permit omission of bulkheads required by other parts of the regulations in this chapter dealing with machinery installations, etc.

(b) Every mechanically propelled vessel of more than 75 gross tons, or carrying more than 49 passengers shall be subdivided so as not to submerge the margin line with any one main compartment flooded.

(c) Every vessel carrying more than 400 passengers shall, in addition to the requirements of paragraph (b) of this section, be subdivided so as not to submerge the margin line with the fore peak and the adjacent main compartment both flooded.

(d) Every vessel carrying more than 600 passengers shall, in addition to the requirements of paragraph (b) of this section, be subdivided so as not to submerge the margin line with any two adjacent main compartments flooded within at least the forward 40 percent of the vessel's length from the forward perpendicular.

(e) Every vessel carrying more than 800 passengers shall, in addition to the requirements of paragraph (b) of this section, be subdivided so as not to submerge the margin line with any two adjacent main compartments flooded within at least 60 percent of the vessel's length from the forward perpendicular.

(f) Every vessel carrying more than 1,000 persons shall be subdivided by main transverse watertight bulkheads so as not to submerge the margin line with any two adjacent main compartments flooded.

§ 73.15–10 *Compartmentation of ferry vessels.* (a) Every ferry vessel 150 feet or less in waterline length shall be subdivided by main transverse watertight bulkheads so as not to submerge the margin line with any one main compartment flooded. However, if sufficient air tankage or other internal buoyancy is provided to float the vessel when completely flooded, the bulkheads may be dispensed with unless the vessel is in

Great Lakes service, in which case the peak collision bulkhead must be retained.

(b) Every ferry vessel over 150 feet in waterline length shall, in addition to one-compartment subdivision, be subdivided so as not to submerge the margin line with either of the peak compartments and its adjacent main compartment both flooded.

(c) Every ferry vessel over 200 feet in waterline length shall be subdivided by main transverse watertight bulkheads so as not to submerge the margin line with any two adjacent main compartments flooded.

§ 73.15–15 *Minimum spacing of bulkheads.* (a) To be considered effective, watertight bulkheads abaft the collision bulkheads shall be spaced not less than 10 feet plus 3 percent of the load waterline length. For ferry vessels, this minimum spacing shall be applicable between peak bulkheads.

§ 73.15–20 *Stepped bulkheads.* (a) Watertight bulkheads shall not be stepped unless additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead. Where a vessel can withstand flooding of the two adjacent compartments separated by a stepped bulkhead and no part of such bulkhead is nearer to either of the other bulkheads bounding the adjacent compartments than is permitted by § 73.15–15, the step will be acceptable.

§ 73.15–25 *Recessed bulkheads.* (a) If watertight bulkheads are recessed, the recess shall be inboard from the vessel's side by at least one-fifth the beam amidship measured at right angles to the centerline at the level of the load waterline, otherwise, the bulkhead shall meet the requirements for a stepped bulkhead.

(b) For vessels in other than ocean or coastwise service, where the maximum molded beam at the deck and at the load waterline differ appreciably, the inboard damage penetration may be assumed at a mean position between that corresponding to one-fifth the maximum molded beam at the deck measured inboard at the deck and that corresponding to one-fifth the maximum molded beam at the load waterline measured inboard at the load waterline.

§ 73.15–30 *Equivalent plane bulkheads.* (a) Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.

SUBPART 73.20—PEAK AND MACHINERY SPACE BULKHEADS, SHAFT TUNNELS

§ 73.20–1 *Collision bulkhead.* (a) Every vessel except as noted herein shall have a fore peak or collision bulkhead, which shall be watertight up to the bulkhead deck. This bulkhead shall be fitted not less than 5 percent of the length of the vessel (5 feet minimum for steam vessels), and not more than 10 feet plus 5 percent of the length of the vessel from the forward perpendicular. For ferry vessels, this is applicable to both peak bulkheads. However, for ferry vessels and vessels in lakes, bays, and sounds or river service, where internal buoyancy is permitted in lieu of bulkheads, collision bulkheads are not required.

(b) If a vessel in ocean or coastwise service has a long forward superstructure, the fore peak bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly over the bulkhead below, provided it is at least 5 percent of the length of the vessel from the forward perpendicular and the part of the bulkhead deck which forms the step is made effectively weathertight.

(c) Notwithstanding any other provisions regarding permissible location of openings in bulkheads, watertight doors, portable plates, and similar openings will not be permitted in the collision bulkhead. This will not apply to doors fitted in weathertight bulkheads above the bulkhead deck.

§ 73.20–5 *Machinery space bulkheads.* (a) In vessels other than vessels where internal buoyancy is provided to replace subdivision bulkheads, the machinery space as defined in § 73.05–10 shall be divided from the cargo and passenger spaces forward and aft by bulkheads that are fitted watertight up to the bulkhead deck.

§ 73.20–10 *After peak bulkhead.* (a) On vessels over 150 gross tons, and all vessels on an international voyage regardless of tonnage, an after peak bulkhead shall be fitted and made watertight up to the bulkhead deck. However, this bulkhead may be stopped below the bulkhead deck provided the degree of safety of the vessel as regards subdivision is not thereby diminished.

§ 73.20–15 *Shaft tunnels.* (a) On all vessels over 150 gross tons in ocean, coastwise, or Great Lakes service, and all vessels on an international voyage regardless of tonnage, stern tubes shall be enclosed in watertight spaces of moderate volume. The stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the margin line will not be submerged.

SUBPART 73.25—DOUBLE BOTTOMS

§ 73.25–1 *Application.* (a) The provisions of this subpart shall be applicable to all vessels on international voyages, and in ocean, coastwise, or Great Lakes service.

§ 73.25–5 *Extent of double bottoms.* (a) A double bottom should be fitted extending from the fore peak bulkhead to the after peak bulkhead as far as is practicable and compatible with the design and proper working of the vessel.

(b) In vessels 200 feet and under 249 feet in length a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable.

(c) In vessels 249 feet and under 330 feet in length a double bottom shall be fitted at least outside the machinery space, and shall extend to the fore and afterpeak bulkheads, or as near thereto as practicable.

(d) In vessels 330 feet in length and upwards a double bottom shall be fitted amidships and shall extend to the fore and afterpeak bulkheads or as near thereto as practicable.

(e) Where a double bottom is required to be fitted, the inner bottom shall be continued out to the vessel's sides in such a manner as to protect the bottom to the turn of bilge. Such protection will be deemed satisfactory if the line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any point than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25 degrees to the base line and cutting it at a point one-half the vessel's molded breadth from the middle line.

(f) A double bottom need not be fitted in way of watertight compartments of moderate size used exclusively for the carraige of liquids, provided the safety of the ship, in the event of bottom or side damage, is not, in the opinion of the Commandant, thereby impaired.

§ 73.25–10 *Wells in double bottoms.* (a) Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary, nor shall they be less than 18 inches from the outer bottom or from the inner edge of the margin plate. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel of screw vessels. Other wells, such as for lubricating oil under main engines, may be permitted by the Commandant, if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this section.

§ 73.25–15 *Manholes in double bottoms.* (a) The number of manholes in the inner bottom shall be reduced to the minimum compatible with the design and necessity for access to the double bottom. Efficient covers, capable of being made thoroughly watertight and effectively protected from damage by cargo, or coal, shall be fitted to the manholes.

§ 73.25–20 *Watertight floors in double bottoms.* (a) Watertight transverse divisions should be fitted in the double bottom under each main watertight subdivision bulkhead or as near thereto as practicable. Where duct keels are fitted, the transverse divisions need not extend across the duct keel.

SUBPART 73.30—PENETRATIONS AND OPENINGS IN WATERTIGHT BULKHEADS

§ 73.30–1 *General.* (a) The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the vessel; satisfactory means shall be provided for closing these openings.

§ 73.30–5 *Pipes, cables, etc.* (a) Where pipes, scuppers, electric-light cables, etc., are carried through watertight subdivision bulkheads, arrangements shall be made to insure the integrity of the watertightness of the bulkheads.

§ 73.30–10 *Valves and cocks.* (a) Valves and cocks not forming part of a piping system shall not be permitted in watertight subdivision bulkheads.

§ 73.30–15 *Prohibited locations for access openings.* (a) No doors, manholes, or access openings are permitted in the following locations:

(1) Collision bulkhead below the margin line.

(2) Watertight transverse bulkheads dividing a cargo space from an adjoining cargo space or from a permanent or reserve bunker, except as provided in § 73.35–5 (c).

§ 73.30–20 *Pipes through collision bulkhead.* (a) For details of piping through collision bulkheads, see Subchapter F (Marine Engineering) of this chapter.

§ 73.30–25 *Watertight door limitations*—(a) *General.* (1) Watertight door openings shall be located as high in the bulkhead and as far inboard as practicable. The number of watertight doors shall be reduced to the minimum consistent with the design and proper working of the vessel.

(b) *Machinery space doors.* (1) Within the machinery space and apart from bunker and shaft tunnel doors, not more than one door may be fitted in each main transverse bulkhead for intercommunication. These doors shall be of the sliding type except as provided on certain vessels in § 73.35–5 (b) and the hand gear for operating the doors from above the bulkhead deck shall be situated outside the machinery space if this is consistent with a satisfactory arrangement of the necessary gearing.

(c) *Bunker doors.* (1) Watertight doors fitted in bulkheads between permanent and reserve bunkers shall be always accessible except as provided in § 73.35–15 (b) for between deck bunker doors. Satisfactory arrangements shall be made by means of screens or otherwise, to prevent the coal from interfering with the closing of watertight bunker doors.

§ 73.30–30 *Trunkways or tunnels.* (a) Where trunkways or tunnels for access from crew's accommodations to the stokehold, for piping, or for any other purpose are carried through main transverse watertight bulkheads, they shall be watertight and in accordance with structural requirements for watertight bulkheads. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the margin line. The access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead.

(b) A short tunnel extending through not more than one main subdivision compartment and which is closed at one end need not be fitted with a door at the other end, provided its sides are not nearer to the shell than is permitted for the sides of a recess in a bulkhead as stated in § 73.15–25 and the volume of the tunnel, if included with the volume of the compartment to which it opens, does not result in the equivalent length of such compartment being in excess of the permissible length.

(c) Where it is proposed to fit tunnels or trunkways for forced draft, piercing main transverse watertight bulkheads, these shall receive the special consideration of the Commandant.

§ 73.30–35 *Portable plates.* (a) Openings closed only by portable bolted plates are not permitted in watertight subdivision bulkheads except in machinery spaces. Such plates shall always be in place and made watertight before the vessel leaves port and shall not be removed at sea except in case of urgent necessity.

§ 73.30–40 *Openings above margin line.* (a) Where a portion of an assumed margin line is appreciably below the deck to which bulkheads are carried, and it can be shown that the maintenance of complete watertightness will result in undue hardship in the arrangement of the vessel, a limited amount of nontight bulkhead penetrations may be permitted as high as possible immediately under the bulkhead deck. Such penetrations shall be subject to specific approval in each instance and will generally be limited as follows:

(1) Not more than 2 feet below the molded line of the bulkhead deck.

(2) Not less than 9 inches above the margin line.

(3) Not outboard of vertical lines located off the center line at a distance of ¼ the full breadth of the ship measured on the bulkhead deck at the point in question.

(b) Approved nontight bulkhead penetrations shall be indicated on a suitable plan carried aboard the vessel.

SUBPART 73.35—WATERTIGHT BULKHEAD DOORS

§ 73.35–1 *Types and classes.* (a) The only types of watertight doors permissible are hinged doors, sliding doors, and doors of other equivalent patterns, excluding plate doors secured only by bolts and doors required to be closed by dropping or by the action of a dropping weight. Sliding doors may have horizontal or vertical motion. The permissible classes of doors are:

Class 1—Hinged doors.
Class 2—Sliding doors, operated by hand gear only.
Class 3—Sliding doors, operated by power and by hand gear.

(b) Where a door of a particular class is specified, a door of a class bearing a lower number may not be fitted, but a door of a class bearing a higher number may be fitted unless otherwise noted.

§ 73.35–5 *Class 1 doors, permissible locations.* (a) Class 1 doors within passenger, crew, and working spaces are only permitted above a deck, the molded line of which, at its lowest point at side, is at least 7 feet above the deepest subdivision load line, and they are not permitted in such spaces below such a deck except as permitted in paragraph (b) of this section.

(b) On vessels under 150 gross tons in coastwise or Great Lakes service not proceeding more than 20 miles from shore and on all vessels on other inland waters, Class 1 doors may be permitted within any accommodation and working spaces provided it is practical to keep such doors closed at all times except when actually being used for transit.

(c) Class 1 doors may be fitted in bulkheads dividing cargo deck spaces at the highest level consistent with practicability. On vessels on an international voyage, or in ocean and coastwise service, such doors shall be restricted to the 'tween deck spaces. The outboard vertical edges of such doors shall be situated at a distance from the shell plating which is not less than one-fifth the breadth of the vessel, as defined in § 73.05–4, such distance being measured at right angles to the centerline of the vessel at the level of the deepest subdivision load line. These doors shall be closed before the voyage commences and shall be kept closed during navigation. Where any such doors may be accessible at any time during the voyage, they shall be fitted with locks to prevent their being opened. Where it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Commandant, and a statement shall be required from the owners certifying as to the absolute necessity of such doors. Class 2 or Class 3 watertight doors cannot be substituted for Class 1 doors in these locations.

§ 73.35–10 *Class 2 doors, permissible locations.* (a) All watertight doors in main transverse subdivision bulkheads that are not specifically required to be of Class 1 or Class 3, may be of Class 2.

§ 73.35–15 *Class 3 doors, permissible locations.* (a) When the number of sliding watertight doors whose sills are below the level of the deepest subdivision load line, excluding doors at the entrances of tunnels, exceeds 5, all the sliding watertight doors shall be of Class 3; if the number is 5 or less but the criterion numeral exceeds 30, all the sliding watertight doors shall be of Class 3 except that the Commandant may allow watertight doors of Class 2 if there is only one watertight door other than the tunnel door and it is located in the machinery space.

(b) If watertight doors are fitted between bunkers in the 'tween decks below the bulkhead deck and have to be opened at sea for the purpose of trimming coal, these doors shall be of Class 3.

(c) When trunkways, in connection with refrigerated cargo, are carried through more than one main transverse watertight bulkhead and the sills of the trunkway doors are less than 7 feet above the deepest subdivision load line, these doors shall be of Class 3.

§ 73.35–20 *Door operating requirements.* (a) Hinged watertight doors (Class 1) shall be fitted with catches workable from either side of the bulkhead so spaced that the door can be made effectively watertight. In the case of a door which is required to be closed before the voyage commences and kept closed all during the voyage, the catches may be fitted to operate from one side only, provided it be shown that under all operating conditions the door shall be always closed from the one side.

(b) For Class 2 sliding watertight doors, hand-operating gear shall be provided and shall be capable of being oper-

ated from positions on each side of the door itself and also from a position above the bulkhead deck. These control stations shall be accessible in all cases.

(c) Class 3 sliding watertight doors shall be power-operated from a central control on the bridge and also by power controls at the door location. The arrangement shall be such that the door will close automatically if opened by the local control after being closed from the central control and also such that any door can be kept closed by local arrangements which will prevent that door from being opened from the central control. Such power operated doors shall also be provided with hand gear, operable from both sides of the door itself and also from an accessible position above the bulkhead deck.

§ 73.35–25 *Door indicators and warning signals.* (a) For sliding watertight doors, Class 2 and Class 3, indicators shall be fitted at all operating stations other than at the door itself, showing whether the doors are open or closed and at all operating stations directions for closing the doors shall be clearly marked, as required by § 78.47–37 of this subchapter.

(b) Provision shall be made to give warning signal by electric horn or howler when the door is about to be closed; the signal shall precede the movement of the door by a safe interval.

§ 73.35–30 *Doors, design, installation, and tests.* (a) The design of all watertight doors shall be subject to approval by the Commandant.

(b) Each Class 1 door installed on a vessel in ocean or coastwise service shall be tested by water pressure to a head up to the margin line, but in no case less than 10 feet. Such doors on vessels in other services shall be tested in the same manner as the bulkhead in which they are fitted.

(c) Each Class 2 and Class 3 door shall be designed, tested, and installed in accordance with Subpart 163.001 of Subchapter Q (Specifications) of this chapter.

SUBPART 73.40—OPENINGS IN VESSEL'S SIDES BELOW THE BULKHEAD DECK

§ 73.40–1 *General.* (a) The requirements of this section apply to all openings in the sides of vessels below the bulkhead deck whether or not such openings give direct access to spaces above or below the bulkhead deck, except as otherwise specified in this subchapter.

(b) In the case of a vessel not having a continuous bulkhead deck it is necessary that special consideration should be given to the application of this section, particularly with regard to openings through the sides of the vessel in way of or leading from spaces below the highest of the trim lines used in the development of the floodable length curves.

(c) The number of openings in vessel's sides below the bulkhead deck shall be reduced to the minimum compatible with the proper design and working of the vessel.

(d) The arrangement and efficiency of the means for closing each opening shall be consistent with its intended purpose and the position in which it is fitted, and shall be to the satisfaction of the Commandant.

§ 73.40–5 *Port lights.* (a) Port lights on vessels under 150 gross tons in ocean or coastwise service, and on all vessels in Great Lakes, lakes, bays, and sounds, or river service as follows:

(1) No port lights are permitted in the vessel's side below the bulkhead deck.

(b) Port lights on vessels of 150 gross tons and over in ocean or coastwise service as follows:

(1) If, in a 'tween deck, the sills of any port lights are below a line drawn parallel to the molded line of the bulkhead deck at side and having its lowest point 2½ percent of the breadth of the vessel above the deepest subdivision load line, all port lights in that 'tween deck shall be of a nonopening type.

(2) All port lights, the sills of which are below the bulkhead deck, other than those required to be of a nonopening type shall be of such construction as will effectively prevent any person opening them without the consent of the master of the vessel.

(3) No port lights shall be fitted in spaces which are appropriated exclusively to the carriage of cargo, stores, or coal.

(4) Port lights may be fitted in spaces appropriated alternately to the carriage of cargo or passengers and they shall be of the type required by their location in the vessel, provided dead covers are always fitted when cargo is carried.

(5) Design of port lights below the bulkhead deck as follows:

(i) All port lights are to be of substantial construction subject to approval of the Commandant.

(ii) Nonopening port lights are to be thoroughly watertight and port lights which are capable of being opened shall be so constructed that they can be easily and effectively closed and secured watertight. Port lights capable of being opened shall have a special round slotted or recessed nut requiring a special wrench fitted on one or more of the bolts. The special nuts are to be protected by sleeves or guards so as to render them incapable of being released by the use of ordinary tools, such as pipe wrenches, etc.

(c) *Dead covers.* (1) Hinged inside dead covers shall be fitted to all port lights below the margin line except that dead covers may be portable in passenger accommodations other than for steerage passengers provided they are stowed adjacent to their respective port lights and that all the following conditions are complied with.

(i) Such port lights are above the deck to which the minimum freeboard for the vessel can be obtained.

(ii) Such port lights are abaft one-eighth of the vessel's length from the forward perpendicular.

(iii) Such port lights are above a line drawn parallel to the bulkhead deck at side and having its lowest points at a height of 12 feet plus 2½ percent of the breadth of the vessel above the deepest subdivision load line.

(2) Dead covers shall be of efficient design and arranged so that they can be easily and effectively secured watertight. Where fitted to opening-type port lights, they shall be of such design that it will be necessary to release the special or locked nut in order to secure the dead cover.

§ 73.40–10 *Automatic ventilators.* (a) Automatic ventilators shall not be fitted in vessel's sides below the bulkhead deck without the special sanction of the Commandant.

§ 73.40–15 *Side ports.* (a) Gangway, cargo, and coaling ports, and similar openings in the vessel's sides shall be designed and constructed to the approval of the Commandant. Such ports or openings shall be in no case fitted so as to have their lowest point below the deepest subdivision load line.

§ 73.40–20 *Piping openings in vessel's sides.* (a) Requirements for inlets and discharges of scuppers, sanitary piping, main and auxiliary machinery piping, and ash and rubbish-chutes, etc., are in Subchapter F (Marine Engineering) of this chapter.

SUBPART 73.45—OPENINGS ABOVE THE BULKHEAD DECK

§ 73.45–1 *General.* (a) All side openings in the vessel's shell above the bulkhead deck and all deck openings in or above the bulkhead deck shall comply with the applicable requirements of Subchapters E (Load Lines) and F (Marine Engineering) of this chapter for type closures and fittings. For vessels not subject to the requirements of Subchapter E (Load Lines) of this chapter, the bulkhead deck, or superstructure enclosing any portion thereof, shall be effectively weathertight and adequate freeing arrangements shall be provided.

SUBPART 73.90—VESSELS CONTRACTED FOR PRIOR TO NOVEMBER 19, 1952

§ 73.90–1 *Requirements.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arangements, materials, and facilities previously approved will be considered satisfactory so long as they meet the minimum requirements of this section, and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details and arrangements shall be in general agreement with the applicable provisions of Subparts 73.05 through 73.45 insofar as is reasonable and practicable.

PART 74—STABILITY

Chapter I is amended by adding a new Part 74 to Subchapter H reading as follows:

SUBPART 74.01—APPLICATION

Sec.
74.01–1 General.

SUBPART 74.05—STABILITY TEST

74.05–1 When required.
74.05–5 Procedure.

SUBPART 74.10—STABILITY STANDARDS

74.10–1 General.
74.10–5 Weather criteria.

Sec.
74.10–10 Passenger criteria.
74.10–15 Damaged stability standards.
74.10–20 Special operating conditions.

SUBPART 74.15—BALLAST

74.15–1 When required.
74.15–5 How installed.
74.15–10 Liquid ballast.

SUBPART 74.20—STABILITY INSTRUCTIONS FOR OPERATING PERSONNEL

74.20–1 Data supplied master.
74.20–5 Conditions under which calculations made.
74.20–10 Cross-flooding.
74.20–15 Type of instructions.

SUBPART 74.25—STABILITY LETTER

74.25–1 Posting.

AUTHORITY: § 74.01–1 to 74.25–1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, and 4490, as amended, sec. 3, 24 Stat. 129, 41 Stat. 305, sec. 2, 45 Stat. 1493, sec. 2, 49 Stat. 888, sec. 5, 49 Stat. 1384, secs. 1, 2, 49 Stat. 1544, sec. 3, 54 Stat. 346, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 482, 483, 363, 85a, 88a, 369, 367, 1333, 50 U. S. C. App. 1275.

SUBPART 74.01—APPLICATION

§ 74.01–1 *General.* (a) The provisions of this part shall apply to the following vessels:

(1) All vessels on an international voyage.

(2) All vessels carrying more than 49 passengers or of more than 75 gross tons.

(3) All ferry vessels.

(4) Any other vessel whose stability is questioned by the Officer in Charge, Marine Inspection.

SUBPART 74.05—STABILITY TEST

§ 74.05–1 *When required.* (a) Except as otherwise provided in this section, each vessel to which this part applies, shall be subjected to a stability test conducted under the supervision of the Coast Guard and the results of the test shall be approved before the vessel is placed in service.

(b) The Commandant may allow the stability test of a vessel to be dispensed with provided basic stability data are available from the stability test of a sister vessel and it is shown to the satisfaction of the Commandant that reliable stability information for the exempted vessel can be obtained from such basic data.

(c) Except for vessels on an international voyage, the Commandant may allow the stability test of a vessel to be dispensed with in exceptional cases where it can be shown to his satisfaction that due to the form, construction, and arrangement of the vessel stability calculations can be safely made without a stability test being performed.

§ 74.05–5 *Procedure.* (a) Stability tests conducted on or after November 19, 1952, shall meet the requirements of this section.

(b) Plans required: (1) The following plans are essential for use in conducting the stability test and determining the results, and if these plans have not been previously submitted, they shall be made available at the time of the test:

Lines plan.
Curves of form or hydrostatic curves.
General arrangement plans of decks, holds, inner bottoms, etc.
Outboard profile.
Inboard profile.
Midship section.
Capacity plan showing capacities and vertical and longitudinal centers of gravity of cargo spaces, tanks, etc.
Tank sounding tables.
Draft mark locations.

(c) Stability test preparations: (1) Preparations as noted in this paragraph shall be made to place a vessel in suitable condition for a stability test. The Coast Guard representative supervising the stability test may relax from these standards in a particular instance if, in his opinion, such relaxation is warranted and will not materially affect the reliability of the results of the test.

(2) To obtain dependable stability results, all tanks on the vessel, as far as practicable, shall be either completely empty and dry or fully pressed up and without air pockets. Where this is impracticable, slack tanks may be accepted provided their free surface can be readily and accurately determined for the angles of heel to be obtained during the stability test.

(3) The vessel shall be as nearly complete as practicable when the test is conducted. If additional material or equipment is to be installed after the test, a complete list of such items by weight and location shall be prepared.

(4) All dunnage, tools, and other items extraneous to the completed vessel shall be removed before the test.

(5) The vessel shall be moored in a location reasonably protected from broadside wind, waves and tide. The depth of water shall be sufficient to provide ample clearance under the vessel against grounding. Mooring lines shall be arranged so that they will not interfere with the free rolling or listing of the vessel.

SUBPART 74.10—STABILITY STANDARDS

§ 74.10–1 *General.* (a) With the vessel in the intact condition, the net metacentric height at any operating draft, including allowance for normally slack tanks, shall not be less than the standards outlined in this subpart, taken singly, and the most severe requirement shall govern at any particular draft.

§ 74.10–5 *Weather criteria.* (a) The required minimum metacentric height (GM) in feet at any particular draft is obtained from the following formula:

$$GM=\frac{PAh}{\Delta \tan \theta} \qquad (1)$$

where:

$P=.005+\left(\frac{L}{14{,}200}\right)^2$ tons/ft² for ocean and coastwise service.

$=.0033+\left(\frac{L}{14{,}200}\right)^2$ tons/ft² for partially protected waters such as lakes, bays, and sounds, and Great Lakes (summer service).

$=.0025+\left(\frac{L}{14{,}200}\right)^2$ tons/ft² for protected waters such as rivers, harbors, etc.

L = Length between perpendiculars in feet.
A = Projected lateral area in square feet of portion of vessel above waterline.
h = Vertical distance in feet from center of A to center of underwater lateral area or approximately one-half draft point.
Δ = Displacement in long tons.
θ = Angle of heel to one-half the freeboard to the deck edge or 14 degrees whichever is less. (For vessels having a discontinuous weather deck or abnormal sheer, the angle to one-half the freeboard may be suitably modified.)

§ 74.10–10 *Passenger criteria.* (a) The required minimum meta-centric height (GM) in feet is obtained from the following formula:

$$GM=\frac{N\times b}{24\Delta \tan \theta} \qquad (1)$$

where:

N = Number of passengers.
b = Distance in feet from the vessel's centerline to the geometrical center of the passenger deck area on one side of centerline.
Δ = Displacement in long tons.
θ = Angle of heel to deck edge or 14 degrees, whichever is less.

§ 74.10–15 *Damaged stability standards*—(a) *Application.* (1) The provisions of this section shall apply to all vessels that are required by Subparts 73.10 and 73.15 of this subchapter to have at least a one-compartment standard of subdivision, and with the exception of paragraph (k) of this section, shall apply to all such vessels contracted for on or after November 19, 1952. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of paragraph (k) of this section.

(b) *General requirements.* (1) Sufficient intact stability shall be provided in all service conditions so as to enable the vessel to withstand flooding at any place throughout its length due to the assumed side damage as outlined in paragraph (c) (4) of this section.

(2) Where two adjacent main subdivision compartments are separated by a bulkhead which is stepped under the conditions of § 73.10–40 or 73.15–20, the intact stability shall be adequate to withstand the flooding assumed under § 73.10–40 or 73.15–20 of this subchapter, as applicable.

(c) *Damaged stability calculations.* (1) The requirements of Paragraph (b) of this section shall be determined by calculations which take into consideration the proportions and design characteristics of the vessel and the arrangement and configuration of the damaged compartments. Where decks, inner skins, or longitudinal bulkheads are to be fitted of sufficient tightness to seriously restrict the flow of water, the Commandant shall be satisfied that proper consideration is given to such restrictions in the calculations.

(2) In making these calculations the vessel is to be assumed in the worst anticipated service condition as regards stability.

(3) For damaged stability calculations the volume and surface permeabilities shall be as indicated in Table 74.10–15 (c) (3).

TABLE 74.10-15 (c) (3)

Spaces	Permeability
Occupied by cargo, coal or stores	60
Occupied by accommodations	95
Occupied by machinery	85
Intended for liquids (use value resulting in more severe requirement)	0 or 95

(4) The minimum assumed extent of side damage shall be taken in accordance with Table 74.10-15 (c) (4). Where any damage of a lesser extent than provided in the table would result in a more severe condition regarding heel or loss of metacentric height, such damage shall also be considered in the calculations.

TABLE 74.10-15 (c) (4)

Vessel category	Longitudinal extent [1]	Transverse extent [2] [3]	Vertical extent [4]
All vessels	10 feet+0.03L or 35 feet (whichever is less) no main bulkhead involved.	⅕ B	Top of double bottom to margin line.
Vessels without factor of subdivision, where two compartment subdivision is required.	10 feet+0.03L or 35 feet (whichever is less) involving one main bulkhead.	⅕ B	Top of double bottom to margin line.
Vessels with factor of subdivision of 0.50 or less.	20 feet+0.04L involving not more than one main bulkhead.	⅕ B	Top of double bottom to margin line.
Vessels with factor of subdivision of 0.33 or less.	30 feet+0.06L	1/10 B	Top of double bottom to margin line.

[1] L equals the length of the vessel as defined in § 73.05-3.
[2] B equals the breadth of the vessel as defined in § 73.05-4.
[3] The transverse extent of damage is measured inboard from the vessel's side and at right angles to the centerline at the level of the deepest subdivision load line. For vessels on inland waters and for ferry vessels, where the maximum molded beam at the deck and at the load water line differ appreciably, the transverse extent of damage may be taken as the mean between the inboard penetration at the deck using the maximum beam at the deck and the inboard penetration at the deepest subdivision load line using the maximum beam at that load line.
[4] Where no double bottom is fitted, the vertical extent of damage shall be taken from the molded baseline.

(5) Unsymmetrical flooding is to be kept to a minimum consistent with efficient arrangements. Where special cross-flooding fittings are provided, such fittings and the maximum heel before equalization shall be to the satisfaction of the Commandant. On vessels under 150 gross tons in ocean or coastwise service and on all vessels in lake, bay, and sound or river service, the equalizing arrangements, where required, shall not be dependent either upon manual or automatic operation of valves or similar appliances.

(6) For symmetrical flooding, the final residual metacentric height after damage shall be positive.

(7) For unsymmetrical flooding with assumed side damage less than 30 feet plus .06L, the final heel due to the unsymmetrical moment shall not exceed 7 degrees, except that in special cases the Commandant may allow additional heel, but in no case shall the final heel exceed 15 degrees.

(8) For unsymmetrical flooding with assumed side damage of 30 feet plus .06L, the final heel due to the unsymmetrical flooding shall in no case exceed 20 degrees.

(9) In no case shall the margin line be submerged in the final stage of flooding. If it is considered that the margin line may become submerged during an intermediate stage of flooding, the Commandant may require such investigations and arrangements as shall be considered necessary for the safety of the vessel.

(d) *Relaxation of requirements.* (1) No relaxation from the requirements for damaged stability may be considered by the Commandant unless it is shown that the intact metacentric height in any service condition necessary to meet these requirements is excessive for the service intended.

(2) Relaxations from the requirements for damaged stability shall be permitted only in exceptional cases and subject to the conditions that the Commandant is to be satisfied that the proportions, arrangements and other characteristics of the vessel are the most favorable to stability after damage which can practically and reasonably be adopted in the particular circumstances.

(k) *Vessels contracted for prior to November 19, 1952.* (1) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(i) Existing arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they meet the minimum requirements of this subparagraph and they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(ii) The details and arrangements shall be in general agreement with the provisions of paragraphs (b) through (d) of this section, except that on vessels where it has not been found reasonable nor practicable to apply at least a one-compartment standard of subdivision, such vessels will not be required to comply with this subparagraph.

§ 74.10-20 *Special operating conditions.* (a) Where a vessel may be operated under conditions where its stability will be affected by factors not covered by §§ 74.10-5 through 74.10-15 such factors shall be investigated to determine if the vessel has sufficient stability to meet such conditions.

SUBPART 74.15—BALLAST

§ 74.15-1 *When required.* (a) Where it is determined that a vessel does not have sufficient stability to meet the requirements of the stability standard and the characteristics of the vessel cannot be altered to provide the required stability, ballast may be required. This ballast may be solid fixed ballast, liquid ballast, or both.

§ 74.15-5 *How installed.* (a) Solid ballast, when required, shall be installed in the vessel under the supervision of the Officer in Charge, Marine Inspection. The amount of installed ballast shall be weighed or otherwise accurately determined and located in a vertical and longitudinal position to meet the stability requirements. This ballast shall be stowed in a satisfactory manner to prevent shifting of position in a seaway. Such ballast required for stability shall not be removed from the vessel or relocated unless approved by the Commandant, except that such ballast may be temporarily moved for examination or repair of the vessel, when done under the supervision of an inspector.

§ 74.15-10 *Liquid ballast.* (a) Liquid ballast may be used to the extent that is reasonably practicable in the operation of the vessel.

SUBPART 74.20—STABILITY INSTRUCTIONS FOR OPERATING PERSONNEL

§ 74.20-1 *Data supplied master.* (a) The master of the vessel shall be supplied with the data necessary to maintain sufficient intact stability under service conditions to provide satisfactory operating stability and also to enable the vessel to meet the damaged stability requirements.

§ 74.20-5 *Conditions under which calculations made.* (a) The master of the vessel shall be informed of the conditions under which the damaged stability calculations have been made and advised to what extent the vessels can safely withstand damage under these assumed conditions.

§ 74.20-10 *Cross-flooding.* (a) In the case of a vessel requiring cross-flooding, the master shall be provided with the conditions of stability on which the calculations of heel are based and be warned that excessive heel might result should the vessel sustain damage when in a less favorable condition. Suitable information shall be supplied concerning the use of any special cross-flooding fittings.

§ 74.20-15 *Type of instructions.* (a) These instructions shall be as clear and concise as practicable and shall be prepared by the owner, approved by the Commandant, and furnished to the master of the vessel. If in the case of some vessels, where the instructions can be quite simple, they may be incorporated directly in the stability letter.

SUBPART 74.25—STABILITY LETTER

§ 74.25-1 *Posting.* (a) Each vessel subject to the requirements of this part shall have posted under glass in the pilothouse a stability letter issued by U. S. Coast Guard before the vessel is placed in service operation. This letter shall indicate, either by specific instructions embodied in the letter or by reference to separate instructions available to the master, the conditions of operation under which the vessel will have satisfactory stability.

PART 75—LIFESAVING EQUIPMENT

Chapter I is amended by adding a new Part 75 to Subchapter H reading as follows:

SUBPART 75.01—APPLICATION

Sec.
75.01–1 Applicable to all vessels.
75.01–5 Equipment installed but not required.

SUBPART 75.05—GENERAL PROVISIONS PERTAINING TO LIFESAVING EQUIPMENT

75.05–1 Equipment of an approved type.

SUBPART 75.10—LIFEBOATS, LIFE RAFTS, LIFE FLOATS, AND BUOYANT APPARATUS

75.10–1 Application.
75.10–5 Type of lifeboats, life rafts, life floats, and buoyant apparatus required.
75.10–10 Requirements for vessels in ocean service.
75.10–15 Requirements for vessels in coastwise service.
75.10–20 Requirements for vessels in Great Lakes; lakes, bays, and sounds; or river service.
75.10–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.15—STOWAGE AND MARKING OF LIFEBOATS, LIFE RAFTS, LIFE FLOATS, AND BUOYANT APPARATUS

75.15–1 Application.
75.15–5 General.
75.15–10 Stowage.
75.15–15 Marking.
75.15–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.20—EQUIPMENT FOR LIFEBOATS, LIFE RAFTS, LIFE FLOATS, AND BUOYANT APPARATUS

75.20–1 Application.
75.20–5 General.
75.20–10 Required equipment for lifeboats.
75.20–15 Description of equipment for lifeboats.
75.20–20 Required equipment for life rafts.
75.20–25 Description of equipment for life rafts.
75.20–30 Required equipment for life floats and buoyant apparatus.
75.20–35 Description of equipment for life floats and buoyant apparatus.
75.20–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.25—DAVITS, BLOCKS, AND FALLS

75.25–1 Application.
75.25–5 General.
75.25–10 Requirements for vessels in ocean or coastwise service.
75.25–15 Requirements for vessels in Great Lakes; lakes, bays, and sounds; or river service.
75.25–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.30—LIFEBOAT WINCHES

75.30–1 Application.
75.30–5 General.
75.30–10 Number and type required.
75.30–15 Installation.
75.30–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.33—BLOCKS AND FALLS

75.33–1 Application.
75.33–5 General.
75.33–10 Installations where lifeboat winches are used.
75.33–15 Installations where lifeboat winches are not used.
75.33–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.35—INSTALLATION OF LIFEBOATS, DAVITS, AND WINCHES

75.35–1 Application.
75.35–5 Tests and examinations.

SUBPART 75.40—LIFE PRESERVERS, AND WOOD FLOATS

Sec.
75.40–1 Application.
75.40–5 General.
75.40–10 Number and type required.
75.40–15 Distribution, stowage, and notices.
75.40–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.43—RING LIFE BUOYS AND WATER LIGHTS

75.43–1 Application.
75.43–5 General.
75.43–10 Number required.
75.43–15 Distribution and securing.
75.43–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.45—LINE-THROWING APPLIANCES

75.45–1 Application.
75.45–5 General.
75.45–10 Type required.
75.45–15 Equipment for line-throwing appliances.
75.45–20 Accessibility.
75.45–25 Service recommendations.
75.45–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.50—EMBARKATION AIDS

75.50–1 Application.
75.50–5 Ladders.
75.50–10 Illumination for lifeboat launching operations.
75.50–90 Vessels contracted for prior to November 19, 1952.

SUBPART 75.55—PORTABLE RADIO APPARATUS

75.55–1 Required on international voyage.

SUBPART 75.90—SHIP'S DISTRESS SIGNALS

75.90–1 Application.
75.90–5 Vessels in ocean or coastwise service.
75.90–10 Vessels in Great Lakes service.

AUTHORITY: §§ 75.01–1 to 75.90–10 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4481, 4482, 4488, 4491, as amended, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 474, 475, 481, 489, 367, 526p, 1333, 50 U. S. C. App. 1275.

SUBPART 75.01—APPLICATION

§ 75.01–1 *Applicable to all vessels.* The provisions of this part shall apply to all vessels except as specifically noted in this part.

§ 75.01–5 *Equipment installed but not required.* Where items of lifesaving equipment are not required, but are installed, such equipment and its installation shall meet the requirements of this part.

SUBPART 75.05—GENERAL PROVISIONS PERTAINING TO LIFESAVING EQUIPMENT

§ 75.05–1 *Equipment of an approved type.* (a) Where equipment in this part is required to be of an approved type, such equipment requires the specific approval of the Commandant. Such approvals are published in the FEDERAL REGISTER, and in addition, are contained in Coast Guard publication CG–190, "Equipment Lists for Merchant Vessels."

(b) Specifications for many of the items required to be of an approved type have been promulgated and are contained in Subchapter Q (Specifications) of this chapter. In general, such specifications are of interest only to the manufacturer of specific items of equipment.

SUBPART 75.10—LIFEBOATS, LIFE RAFTS, LIFE FLOATS, AND BUOYANT APPARATUS

§ 75.10–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.10–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.10–90.

§ 75.10–5 *Type of lifeboats, life rafts, life floats, and buoyant apparatus required.*—(a) *Lifeboats.* (1) All lifeboats shall be of an approved type, constructed in accordance with Subpart 160.035 of Subchapter Q (Specifications) of this chapter.

(2) All lifeboats certified to carry 60 or more persons shall be either motor-propelled of Class A or Class B, or shall be fitted with an approved type of hand-propelling gear.

(3) Class A motor-propelled lifeboats shall be fitted with a compression-ignition engine, a radio cabin and a radio installation complying with the requirements of the Federal Communications Commission, and a searchlight constructed in accordance with Subpart 161.006 of Subchapter Q (Specifications) of this chapter.

(4) Class B motor-propelled lifeboats need not have an engine of the compression-ignition type or a radio or searchlight as required by subparagraph (3) of this paragraph.

(5) All lifeboats, except those installed on vessels in river service, shall be fitted with suitable disengaging apparatus consisting of fixed hooks in the lifeboat or mechanical disengaging apparatus. Mechanical disengaging apparatus if fitted, shall be of an approved type, constructed in accordance with Subpart 160.033 of Subchapter Q (Specifications) of this chapter.

(i) All lifeboats installed on ocean or coastwise vessels of over 3,000 gross tons shall be fitted with mechanical disengaging apparatus so arranged as to make it possible for the lifeboats to be launched with their full complement of persons and equipment while such vessels are underway or stopped, and for both ends of the lifeboat to be released simultaneously, under tension or not, by one person. Simultaneous release shall be effected by partially rotating a shaft which shall be continuous and extend from points of contact with the hooks.

(ii) All lifeboats installed on any particular vessel shall be fitted with the same type of releasing gear.

(b) *Life rafts.* (1) All life rafts shall be of an approved type, constructed in acordance with Subpart 160.018 of Subchapter Q (Specifications) of this chapter. Type A life rafts shall be stowed on the standard life raft skids required by § 75.15–10 (c) (1) unless specifically noted otherwise.

(c) *Life floats.* (1) All life floats shall be of an approved type, constructed

in accordance with Subpart 160.027 of Subchapter Q (Specifications) of this chapter.

(d) *Buoyant apparatus.* (1) All buoyant apparatus shall be of an approved type, constructed in accordance with Subpart 160.010 of Subchapter Q (Specifications) of this chapter.

§ 75.10–10 *Requirements for vessels in ocean service*—(a) *Lifeboats.* (1) All vessels shall be provided with sufficient lifeboats to accommodate all persons aboard.

(2) Lifeboats shall be not less than 24 feet in length, except where owing to the size of the vessel, or for other reasons, the Commandant considers the carriage of such lifeboats to be unreasonable or impracticable. However, in no case shall lifeboats be less than 16 feet in length.

(3) Emergency lifeboats: One of the lifeboats on each side of the vessel shall be of suitable size and design for performing emergency work at sea. Such lifeboats shall be normally not more than 26 feet in length and the ratio of length to beam shall be not less than 3.3.

(4) The minimum number of motor-propelled and hand-propelled lifeboats to be carried shall be as given in Table 75.10–10 (a) (4).

TABLE 75.10–10 (a) (4)

Number of lifeboats carried on vessel		Minimum number of lifeboats to be motor-propelled, Class A [1]	Minimum number of lifeboats to be motor-propelled, Class A or B, or hand-propelled
Over	Not over		
------	13	----------	1
13	19	1	1
19	------	2	----------

[1] At least 1 Class A motor-propelled lifeboat shall be installed on any vessel of more than 2,500 gross tons, plying routes on which they are at any point 200 miles offshore.

(b) *Life rafts, life floats, and buoyant apparatus.* (1) All vessels shall be provided with buoyant apparatus sufficient to accommodate 25 percent of all persons on board. Life floats not weighing more than 400 pounds or type A life rafts may be substituted for the buoyant apparatus required.

§ 75.10–15 *Requirements for vessels in coastwise service.* (a) Except as further modified by paragraph (b) of this section, all other vessels to which this section pertains shall be provided with sufficient lifeboats and type A life rafts to accommodate all persons on board. Not less than 75 percent of the total capacity shall be in lifeboats and the remainder may be in life rafts. Such lifeboats shall have a length of at least 16 feet unless otherwise specifically permitted by the Officer in Charge, Marine Inspection, in cases where the crew is insufficient to properly handle lifeboats of such size or where there is insufficient space to properly stow such lifeboats.

(b) In the case of motor vessels of less than 300 gross tons and not on an international voyage, if in the opinion of the Commandant it is unreasonable or impracticable to meet the requirements of paragraph (a) of this section, due to the size and arrangement of the vessel and its intended service, the Commandant may prescribe the size, capacity, and number of lifeboats or other boats of suitable design and construction, life rafts, life floats, and/or buoyant apparatus to be carried as in his opinion is reasonable and practicable. In any case, there shall be sufficient total capacity for all persons on board.

§ 75.10–20 *Requirements for vessels in Great Lakes; lakes, bays and sounds; or river service.* (a) All vessels other than ferryboats and passenger barges shall be provided with lifeboats, life rafts, and life floats as required by Table 75.10–20 (a), except as specifically noted in this paragraph.

TABLE 75.10–20 (a)

	Vessels operating on the Great Lakes				Vessels operating on lakes, bays, and sounds									Vessels operating on rivers	
	Vessels navigating more than 3 miles offshore and where the depth of water on any part of the route is sufficient to submerge the upper deck of the vessel		1. Vessels navigating not more than 3 miles offshore; or 2. Vessels navigating routes where the water is not of a depth on any part of the route to submerge the upper deck of the vessel		Vessels navigating waters other than those tributary to the Pacific Coast of the continental United States, the Atlantic Coast south of the thirty-third parallel of north latitude, and the Gulf of Mexico				Vessels navigating waters tributary to the Pacific Coast of the continental United States, the Atlantic Coast south of the thirty-third parallel of north latitude, and the Gulf of Mexico			Vessels navigating where the average depth of the channel exceeds 3 feet	Vessels navigating where the average depth of the channel does not exceed 3 feet
					Vessels navigating routes, any point of which is more than 3 miles from land, and—						Vessels navigating routes, any point of which is more than 3 miles from land, and—				
					1. Depth of water is sufficient to entirely submerge the vessel in case of disaster		2. Depth of water is not sufficient to entirely submerge the vessel in case of disaster		Vessels navigating routes lying at all points within a distance of 3 miles from land		1. Depth of water is sufficient to entirely submerge the vessel in case of disaster	2. Depth of water is not sufficient to entirely submerge the vessel in case of disaster	Vessels navigating routes lying at all points within a distance of 3 miles from land		
Dates (inclusive)	Winter Sept. 16 to May 14	Summer May 15 to Sept. 15	Winter Sept. 16 to May 14	Summer May 15 to Sept. 15	Winter Oct. 16 to May 14	Summer May 15 to Oct. 15	Winter Nov. 16 to Apr. 14	Summer Apr. 15 to Nov. 15	Winter Nov. 16 to Apr. 14	Summer Apr. 15 to Nov. 15	All year	All year	All year	All year	All year
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Percentage of persons (passengers and crew) to be accommodated	100	50	100	10	[1] 100	[2] 30	100	10	100	10	[2] 30	10	10	10	None.
Percentage of required equipment in lifeboats (minimum)	[3] 75	[3] 40	[3] 25	[3] 25	[3] 35	[3] 35	[3] 25	[3] 25	[3] 25	[3] 25	[3] 25	[3] 25	[3] 25	[4] 25	[4] None.
Percentage of required equipment which may be in type A or type B life rafts	[5] [6] 25	[5] [7] 60	[5] 75	[5] [7] 75	[5] 75	[5] 75	[5] 75	[5] 75	[5] 75	[5] 75	[5] 75	[5] 75	[5] 75	[8] 75	None.

[1] Vessels equipped with wireless telegraphy operating in daylight only and whose routes are at all times within a distance of 10 miles from land may, during the interval between the 16th day of October to the 31st day of October, both dates inclusive, carry lifeboats of sufficient capacity to accommodate at 1 time not less than 30 percent of all persons on board.

[2] Vessels equipped with wireless telegraphy operating in daylight only and whose routes are at all times within a distance of 10 miles from land may, during the interval between the 15th day of May to the 15th day of October, both dates inclusive, carry lifeboats of sufficient capacity to accommodate at 1 time not less than 15 percent of all persons on board.

[3] Vessels of 200 gross tons and upward shall have 1 working boat with life line attached, properly supplied with oars and painter, and kept in good condition at all times and ready for immediate use, in addition to the lifeboats required.

[4] Vessels of 50 gross tons and upward in river service shall have 1 working boat with life line attached, properly supplied with oars and painter, and kept in good condition at all times and ready for immediate use, in addition to any lifeboats required.

[5] At least 50 percent of the life rafts shall have a capacity of more than 15 persons each.

[6] Vessels shall have, in addition to all other lifeboats and life rafts required, 1 additional fully equipped type A or type B life raft which shall be stowed (not necessarily on skids) in such a manner that it will float clear in the event of sinking of the vessel. On all vessels of 300 gross tons and over the life raft shall be not less than 15-person capacity.

[7] Approved life floats may be substituted for life rafts on vessels during the interval between May 15 and September 15 in any 1 year, both dates inclusive.

[8] Approved life floats may be substituted for life rafts on vessels operated south of the thirty-third parallel of north latitude, and on vessels operated north of the thirty-third parallel of north latitude during the interval between the 15th day of May to the 15th day of October, in any 1 year, both dates inclusive.

[9] Approved life floats may be substituted for life rafts.

(1) Motor vessels of less than 50 gross tons, navigating in daylight only, need not be fitted with lifeboats, life rafts, or life floats, provided:

(i) Such vessels are fitted with sufficient air tanks under the deck that the vessel, in its loaded condition, will remain afloat when full of water; or

(ii) Such vessels are fitted with sufficient bulkheads that the vessel, in its loaded condition, will remain afloat with any two compartments damaged.

(2) In the case of a motor vessel in Great Lakes service of less than 300 gross tons, if in the opinion of the Commandant it is unreasonable or impracticable to install the lifeboats, life rafts, or other equipment required by Table 75.10–20 (a) due to the size and arrangement of the vessel and its intended service, the Commandant may prescribe the size, capacity, and number of lifeboats or other boats of suitable design and construction, life rafts, and/or life floats to be carried as in his opinion is reasonable and practicable. In any case, there shall be at least one lifeboat or other suitable boat, and there shall be sufficient total capacity for the percentage of all persons on board required to be accommodated by Table 75.10–20 (a).

(3) In the case of vessels of less than 300 gross tons in lake, bays, sounds; or river service, if in the opinion of the Commandant it is unreasonable or impracticable to install the lifeboats, life rafts, or other equipment required by Table 75.10–20 (a) due to the size and arrangement of the vessel and its intended service, the Commandant may prescribe the size, capacity, and number of lifeboats or other boats of suitable design and construction, life rafts, and/or life floats to be carried as in his opinion is reasonable and practicable. In any case there shall be at least one lifeboat or other suitable boat, and there shall be sufficient total capacity for the percentage of all persons on board required to be accommodated by Table 75.10–20 (a).

(b) *Ferryboats.* (1) All ferryboats of 50 gross tons and over shall be equipped with lifeboats and life rafts in accordance with Table 75.10–20 (b) (1).

TABLE 75.10–20 (b) (1)

Size of ferryboat in gross tons		Cubic feet of lifeboatage required
Over	Not over	
-------	150	60
150	300	120
300	600	[1] 240
600	----------	[1] 360

[1] One-half of the required lifeboatage may be supplied by life rafts of type A or B.

(2) Ferryboats of less than 50 gross tons shall be equipped with lifeboats or Type A or B life rafts as in the opinion of the Officer in Charge, Marine Inspection, having jurisdiction may be necessary in case of disaster to secure the safety of all persons on board.

(d) *Passenger barges.* (1) Passenger barges shall be provided with lifeboats or other boats of suitable design and construction of a capacity in the same proportion to the number of persons carried as is required by Table 75.10–20 (a).

(2) Passenger barges engaged in excursions shall be provided with 2 lifeboats or other boats of suitable design and construction of not less than 60 cubic feet capacity each.

§ 75.10–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this Paragraph, the requirements of §§ 75.10–5 through 75.10–20 shall be complied with insofar as the number and general type of lifesaving equipment is concerned. Existing items of lifesaving equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 75.10–5 through 75.10–20 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. In this respect, spark ignition engines may be retained where Class A motor-propelled lifeboats containing compression ignition engines are required by Table 75.10–10 (a) (4). Minor repairs, alterations, and replacements may be permitted to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable specifications or requirements in this part.

(2) On vessels of over 3,000 gross tons in ocean or coastwise service, all replacements of disengaging apparatus shall meet the requirements of § 75.10–5 (a) (5) (i). On all other vessels in any service, all of the lifeboats on a particular vessel shall be fitted with the same type of disengaging apparatus.

(3) Vessels in coastwise service the keels of which were laid prior to July 2, 1915, during the interval between May 15 and September 15 in any one year, both dates inclusive, shall have sufficient lifeboats, life rafts, or buoyant apparatus to accommodate all persons on board, not more than 30 percent of which may be in buoyant apparatus and not more than a total of 65 percent may be in life rafts and buoyant apparatus.

SUBPART 75.15—STOWAGE AND MARKING OF LIFEBOATS, LIFE RAFTS, LIFE FLOATS, AND BUOYANT APPARATUS

§ 75.15–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.15–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.15–90.

§ 75.15–5 *General.* (a) The lifeboats, life rafts, life floats, and buoyant apparatus shall be readily available in case of emergency, and shall be kept in good working order and available for immediate use at all times when the vessel is being navigated and, insofar as reasonable and practicable, while the vessel is not being navigated.

(b) The decks on which lifeboats, life rafts, life floats, and buoyant apparatus are carried shall be kept clear of freight or any other obstructions which would interfere with the immediate launching of the lifesaving appliance.

§ 75.15–10 *Stowage.* (a) Lifeboats, life rafts, life floats, and buoyant apparatus shall be stowed in such a manner that:

(1) They are capable of being launched in the shortest possible time.

(2) They shall not impede the launching or handling of other lifesaving appliances.

(3) They shall not impede the marshalling of persons at the embarkation stations, or their embarkation.

(4) They shall be capable of being put in the water safely and rapidly even under unfavorable conditions of list and trim.

(b) Lifeboat stowage shall be as follows:

(1) Suitable access to the lifeboats shall be provided to enable the crew to prepare the lifeboats for launching.

(2) Lifeboats shall be so stowed that embarkation into them may be made rapidly and in good order.

(3) Lifeboats shall not be stowed in the bows of the vessel nor as far aft as to be endangered by the propellers or overhang of the stern.

(4) Lifeboats shall be so stowed that it shall not be necessary to lift them in order to swing out the davits. This requirement shall apply to both lifeboats where nesting is permitted.

(5) On vessels in ocean or coastwise service lifeboats, when stowed on a deck more than 15 feet above the deepest seagoing draft, shall be fitted with skates or other suitable means to facilitate launching against an adverse list of up to 15 degrees. However, skates may be dispensed with if, in the opinion of the Commandant, the arrangements are such as to insure that the lifeboats can be satisfactorily launched without such skates.

(6) Ocean and coastwise vessels fitted with radial davits shall, when the weather permits, have one of the lifeboats on each side swung out while at sea, griped in to a boom or rail, and ready for immediate use.

(c) Life raft stowage shall be as follows:

(1) Type A life rafts shall be stowed on standard skids constructed in accordance with Subpart 160.042 of Subchapter Q (Specifications) of this chapter.

(2) Type B life rafts shall be stowed in such a manner that they may be readily launched.

(3) The additional life raft required on Great Lakes vessels by Table 75.10–20 (a) shall be stowed in such a manner that it will float clear in the event of sinking of the vessel. The requirements of the other subparagraphs in this paragraph need not be complied with for such life raft.

(d) Life float and buoyant apparatus stowage shall be as follows:

(1) Life floats and buoyant apparatus shall be stowed in such a manner as to be readily launched. Life floats exceeding 400 pounds in weight shall be stowed in such a manner as not to require lifting before launching.

(2) Life floats and buoyant apparatus shall not be secured to the vessel except by lashings which can be easily slipped. They may be stowed in tiers one above the other, but not more than four high. When stowed in tiers, the separate units shall be kept apart by suitable distance pieces.

(3) Means shall be provided to prevent shifting.

§ 75.15–15 *Marking.* (a) Lifeboats, life rafts, life floats, and buoyant apparatus shall be marked as required by §§ 78.47–60 and 78.47–63.

§ 75.15–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) The provisions of §§ 75.15–5 through 75.15–15 shall be met with the exception that the requirements of § 75.15–10 (b) (5) need only apply if, in the opinion of the Officer in Charge, Marine Inspection, the arrangement or construction of the vessel is such that overhanging decks, openings, or other similar obstructions, make the use of skates or similar appliances necessary.

SUBPART 75.20—EQUIPMENT FOR LIFEBOATS, LIFE RAFTS, LIFE FLOATS, AND BUOYANT APPARATUS

§ 75.20–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.20–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.20–90.

§ 75.20–5 *General.* (a) Equipment for lifeboats, life rafts, life floats, and buoyant apparatus shall be of good quality, efficient for the purpose they are intended to serve, and kept in good condition.

(b) Lifeboats, life rafts, life floats, and buoyant apparatus shall be fully equipped before the vessel is navigated and the equipment shall remain in such lifesaving appliances throughout the voyage. In any case, such lifesaving appliances shall be fully equipped at all times when passengers are on board.

(c) It shall be unlawful to stow in any lifeboat, life raft, life float or buoyant apparatus, any article not required by this subpart unless such article can be properly stowed so as not to reduce the seating capacity or space available to the occupants and so as not to adversely affect the seaworthiness of such appliances or, in the case of lifeboats, overload the davits or winches.

(d) Loose equipment, except boat hooks in lifeboats, shall be securely attached to the lifesaving appliance to which it belongs.

TABLE 75.20–10 (a)

Letter identification	Item	Ocean and Coastwise	Great Lakes	Lakes, bays, and sounds, and rivers
a	Bailer	1	1	None.
b	Bilge pump	1 [1]	None	None.
c	Boathooks	2	1	1.
d	Bucket	2	1	1.
e	Compass and mounting	1	None	None.
f	Ditty bag	1	None	None.
g	Drinking cups	1	None	None.
h	Fire extinguishers (motor-propelled lifeboats only)	2	2	2.
i	First aid kit	1	None	None.
j	Flashlight	1	1 [9]	None.
k	Hatchets	2	2	1.
l	Heaving line	2	None	None.
m	Jackknife	1	None	None.
n	Ladder, lifeboat gunwale	1 [9]	None	None.
o	Lantern	1	1	1.
p	Life line	1	1	1.
q	Life preservers	2	2	2.
r	Locker	1	1	None.
s	Mast and sail (oar-propelled lifeboats only)	1	None	None.
t	Matches	2	1	1.
u	Milk, condensed (pounds per person)	1	None	None.
v	Mirrors, signaling	2	None	None.
w	Oars	1 unit [4]	1 unit [4]	1 unit. [4]
x	Oil, illuminating (quarts)	1	1	None.
y	Oil, storm (gallons)	1	1	None.
z	Painter	2	1	1.
aa	Plugs	1	1	1.
bb	Provisions (pounds per person)	2	None	None.
cc	Radio installation	1 [5]	None	None.
dd	Rowlocks	1 unit [6]	1 unit [6]	1 unit. [6]
ee	Rudder and tiller	1	1	None.
ff	Sea anchor	1	1	None.
gg	Searchlight	1 [8]	None	None.
hh	Signals, distress, floating orange smoke	1 unit [3]	None	None.
ii	Signals, distress, red hand flare	1 unit [4]	1 unit [4 6]	None.
jj	Signals, distress, red parachute flare	1 unit [4 7]	1 unit [3 4]	None.
kk	Water (quarts per person)	3	None	None.

[1] Motor-propelled lifeboats, certified for 100 or more persons, shall be fitted with an additional hand bilge pump of an approved type or a power bilge pump.
[3] Optional—See footnote 6.
[5] Not required on lifeboats of less than 60 persons capacity.
[6] For description of units, see § 75.20–15.
[8] Required only on motor-propelled lifeboats fitted with radio cabin, see § 75.10–5 (a) (3).
[9] An approved flashlight, item (j), or 12 approved parachute red flare distress signals, item (ii), may be substituted for 6 of the required 12 hand red flare distress signals.
[7] Vessels in coastwise service need only carry 1 unit for each 5 lifeboats or fraction thereof.

§ 75.20–10 *Required equipment for lifeboats.* (a) The lifeboats for all vessels shall be equipped in accordance with Table 75.20–10 (a). For a description of the items contained in this table, and the units comprising the items, see the applicable paragraphs of § 75.20–15. The letter identification prefixing the item in the table corresponds to the paragraph designations in § 75.20–15.

§ 75.20–15 *Description of equipment for lifeboats.*—(a) *Bailer.* The bailer shall have a lanyard attached and shall be of sufficient size and suitable for bailing.

(b) *Bilge pump.* Bilge pumps shall be of an approved type, constructed in accordance with Subpart 160.044 of Subchapter Q (Specifications) of this Chapter. They shall be of the size given in Table 75.20–15 (b) depending upon the capacity of the lifeboat as determined by the six-tenths rule as described in § 160.035–8 (b) of Subchapter Q (Specifications) of this chapter.

TABLE 74.20–15 (b)

Capacity of lifeboat cubic feet		Bilge pump size
Over	Not over	
---	330	1
330	700	2
700	---	3

(c) *Boathooks.* Boathooks shall be of the single hook ball point type. Boathook handles shall be of clear grained white ash, or equivalent, and of a length and diameter as given in Table 75.20–15(c)

TABLE 75.20–15 (c)

Length of lifeboat, feet		Boathook handles	
Over	Not over	Diameter, inches	Length, feet
---	23	1¼	8
23	29	1¼	10
29	---	2	12

(d) *Bucket.* The bucket shall be of heavy gage galvanized iron, or other suitable corrosion resistant metal, of not less than 2 gallons capacity, and shall have a 6-foot lanyard of 12 thread manila attached.

(e) *Compass and mounting.* The compass and mounting shall be of an approved type constructed in accordance with United States Coast Guard specification dated December 14, 1944.

(f) *Ditty bag.* The ditty bag shall consist of a canvas bag and shall contain a sailmaker's palm, needles, sail twine, marline, and marline spike.

(g) *Drinking cups.* Drinking cups shall be enameled, and be provided with ⅛ inch diameter cotton lanyards 3 feet in length.

(h) *Fire extinguisher.* Fire extinguishers shall be of approved Type B–C, Size I (see § 76.50–5). One shall be attached to each end of the lifeboat.

(i) *First aid kit.* The first aid kit shall be of an approved type, constructed and fitted in accordance with Subpart 160.041 of Subchapter Q (Specifications) of this chapter.

(j) *Flashlight.* The flashlight shall be of an approved Type I, Size No. 3, constructed in accordance with Subpart 161.008 of Subchapter Q (Specifications) of this chapter. Three spare batteries and two spare bulbs shall be provided with each flashlight. Batteries shall not

remain in the flashlight or be used as spares beyond the serviceable date appearing on the cell or its jacket.

(k) *Hatchet.* Hatchets shall be of an approved type, constructed in accordance with Subpart 160.013 of Subchapter Q (Specifications) of this chapter. They shall be attached to the lifeboat by individual lanyards and be readily available for use, one at each end of the lifeboat.

(l) *Heaving line.* The heaving line shall be of adequate strength, 10 fathoms in length, and 1 inch in circumference. It shall be of such quality as to be buoyant after 24 hours submergence.

(m) *Jackknife.* The jackknife (with can opener) shall be of an approved type, constructed in accordance with Subpart 160.043 of Subchapter Q (Specifications) of this chapter.

(n) *Ladder, lifeboat gunwale.* The lifeboat gunwale ladder shall consist of 3 flat wood steps cut out for hand holds. The steps shall be spaced 12 inches apart and fastened with $\frac{5}{8}$ inch-diameter manila rope. Each rope end shall be tied inside the lifeboat at about amidships with the ladder stowed on top of the side benches and ready for immediate use. Other suitable devices may be specifically approved.

(o) *Lantern.* The lantern shall contain sufficient oil to burn for at least 9 hours, and shall be ready for immediate use.

(p) *Life line.* The life line shall be properly secured to both sides of the lifeboat along its entire length, festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12-thread manila. The bights shall hang to within 12 inches of the water when the lifeboat is light.

(q) *Life preservers.* Life preservers shall be of an approved type, constructed in accordance with the applicable subparts of Subchapter Q (Specifications) of this chapter.

(r) *Locker.* The locker shall be suitable for the storage and preservation of the small items of equipment.

(s) *Mast and sail.* A unit, consisting of a standing lug sail together with the necessary spars and rigging, shall be provided in general agreement with Table 75.20–15 (s). The sails shall be of good quality canvas, colored Indian Orange (Cable No. 70072, Standard Color Card of America). Rigging shall consist of galvanized wire rope not less than $\frac{3}{16}$ inch in diameter. The sail and gear shall be protected by a suitable canvas cover.

TABLE 75.20–15 (s)

Length of lifeboat, feet		Standing lug sail							Mast [1]		Yard [1]	
Over	Not over	Area square feet	Luff and head length	Leach length	Foot length	Clew to throat	Ounces per square yard	Commercial designation number	Length	Diameter	Length	Diameter
			ft. in.	ft. in.	ft. in.	ft. in.			ft. in.	in.	ft. in.	in.
----	17	58	5 11	12 1	8 10	10 10	14.35	10	11 2	3	6 11	2
17	19	74	6 8	13 8	10 0	12 2	14.35	10	12 6	3	7 8	II
19	21	93	7 5	15 1	11 2	13 8	14.35	10	13 10	3½	8 5	2½
21	23	113	8 3	16 11	12 4	15 I	14.35	10	15 II	3½	9 3	2½
23	25	135	9 0	18 6	13 6	16 6	14.35	10	16 6	3¾	10 0	3
25	27	158	9 9	20 0	14 7	17 10	17.50	8	17 10	II	10 9	3
27	29	181	10 5	21 II	15 7	19 I	17.50	8	19 II	4½	11 5	3¼
29	31	203	11 0	22 8	16 6	20 3	20.74	6	20 6	4½	12 II	3¼
31	----	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]

[1] Mast lengths measured from heel to center of upper halyard sheave. Mast diameters measured at thwart. Mast and yard shall be of clear grained spruce, fir, or equivalent.
[2] Subject to special consideration.

(t) *Matches.* A box of friction matches in a watertight container stowed in an equipment locker or secured to the underside of the stern thwart if no locker is fitted.

(u) *Milk, condensed.* One pound of condensed milk shall be provided for each person the lifeboat is certified to carry, to be stowed in lockers or other compartments providing suitable protection.

(v) *Mirrors, signaling.* Signaling mirrors shall be of an approved type.

(w) *Oars.* A unit, consisting of a complement of rowing oars and a steering oar, shall be provided for each lifeboat in accordance with Table 75.20–15 (w), except that motor-propelled and hand-propelled lifeboats need only be equipped with 4 rowing oars and 1 steering oar. In any case, the emergency lifeboats shall be provided with the full complement of oars prescribed by the table.

TABLE 75.20–15 (w)

Length of lifeboat, feet		Number of oars		Length of oars, feet	
Over	Not over	Rowing	Steering	Rowing	Steering
----	15	II	I	8	9
15	19	II	I	10	11
19	21	III	I	11	12
21	23	III	I	12	13
23	25	III	I	13	14
25	27	III	I	14	15
27	----	III	I	15	16

(x) *Oil, illuminating.* One quart of illuminating oil shall be provided in a metal container.

(y) *Oil, storm.* One gallon of vegetable, fish, or animal oil shall be provided in a suitable metal container so constructed as to permit a controlled distribution of oil on the water, and so arranged that it can be attached to the sea anchor.

(z) *Painter.* Painters shall be of manila rope not less than 2¾ inches in circumference and of a length not less than 3 times the distance between the deck on which the lifeboat is stowed and the light draft of the vessel. For lifeboats on vessels in ocean or coastwise service, one of the painters shall have a long eye splice and be attached to the thwart with a toggle. The other painter shall be attached to the stem.

(aa) *Plug.* The automatic drain plug required in the lifeboat shall be provided with a cap or plug attached to the lifeboat by a suitable chain.

(bb) *Provisions.* Two pounds of hard bread or its approved equivalent shall be provided for each person the lifeboat is certified to carry. The provisions shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in lockers or other compartments providing suitable protection.

(cc) *Radio installation.* The radio installation shall comply with the requirements of the Federal Communications Commission.

(dd) *Rowlocks.* A unit, consisting of sufficient rowlocks and rowlock sockets for each oar required by Table 75.20–15 (w) plus two additional rowlocks. The rowlocks shall be attached to the lifeboat by separate chains so as to be available for immediate use, except that the two additional spare rowlocks shall be carried in the equipment locker or stowed near the stern if no locker is fitted. The rowlocks and rowlock sockets shall be distributed so as to provide the maximum amount of single banked oars practicable.

(ee) *Rudder and tiller.* The rudder and tiller shall be constructed in accordance with § 160.035–3 (t) in Subpart 160.035 of Subchapter Q (Specifications) of this chapter.

(ff) *Sea anchor.* The sea anchor shall be of an approved type.

(gg) *Searchlight.* The searchlight shall be of an approved type, constructed in accordance with Subpart 161.006 of Subchapter Q (Specifications) of this chapter. It shall be securely mounted to the top of the radio cabin and its source of power shall be capable of operating the light intermittently for a period of at least 6 hours and continuously for at least 3 hours. Where the power for the radio equipment and the searchlight are derived from the same source, it shall be sufficient to provide for the adequate operation of both appliances. Two spare bulbs shall be provided.

(hh) *Signals, distress, floating orange smoke.* Two approved floating orange smoke distress signals, constructed in accordance with Subpart 160.022 of Subchapter Q (Specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture.

(ii) *Signals, distress, red hand flare.* A unit, consisting of 12 approved hand red flare distress signals in a watertight

container, constructed in accordance with Subparts 160.021 or 160.023 of Subchapter Q (Specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture.

(jj) *Signals, distress, red parachute flare.* A unit, consisting of 12 approved parachute red flare distress signals, with an approved means of projecting them, all contained in a portable watertight container; or 12 approved hand-held rocket-propelled parachute red flare distress signals contained in a portable watertight container. Construction shall be in accordance with Subparts 160.024 or 160.036 of Subchapter Q (Specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture.

(kk) *Water.* The water shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in drinking water tanks, lockers or other compartments providing suitable protection.

§ 75.20–20 *Required equipment for life rafts.* (a) The life rafts for all vessels shall be equipped in accordance with Table 75.20–20 (a). For a description of the items contained in this table and the units comprising the items, see the applicable paragraphs of § 75.20–25. The letter identification prefixing the item in the table corresponds to the paragraph designation in § 75.20–25.

TABLE 75.20–20 (a)

Letter identification	Item	Ocean and coastwise	Great Lakes	Lakes, bays, and sounds; or rivers
a	Boathook	1	1	1.
b	Drinking cups	1	None	None.
c	Jackknife	1	None	None.
d	Life line	1[1]	1[1]	1.[1]
e	Matches	1	1	None.
f	Mirrors, signaling	2	None	None.
g	Oars	1 unit[2]	1 unit[2]	1 unit.[2]
h	Oil, storm (gallons)	1	1	None.
i	Painter	1	1	1.
j	Provisions (pounds per person)	2	None	None.
k	Rowlocks	1 unit[2]	1 unit[2]	1 unit.[2]
l	Sea anchor	1	1	None.
m	Signals, distress	1 unit[3]	1 unit[3]	None.
n	Water (quarts per person)	1	None	None.
o	Water light	1	1	None.

[1] Not required on type A life rafts.
[2] For description of units see § 75.20–25.
[3] Smoke signals not required. Only 6 hand red flare distress signals need be provided.

§ 75.20–25 *Description of equipment for life rafts*—(a) *Boathook.* Boathooks shall be of the single hook ball point type. Boathook handles shall be of clear grained white ash, or equivalent, not less than 8 feet long and 1½ inches in diameter.

(b) *Drinking cups.* Drinking cups shall be enameled and shall be provided with ⅛ inch cotton lanyard, 3 feet in length.

(c) *Jackknife.* The jackknife (with can opener) shall be of an approved type, constructed in accordance with Subpart 160.043 of Subchapter Q (Specifications) of this chapter.

(d) *Life line.* The life line shall be properly secured around the sides and ends of the life raft, festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12 thread manila.

(e) *Matches.* A box of friction matches in a watertight container.

(f) *Mirrors, signaling.* Signaling mirrors shall be of an approved type.

(g) *Oars.* A unit, consisting of 4 rowing oars and one steering oar not less than 8 feet in length shall be provided for life rafts for 7 persons or more. For life rafts for 6 persons or less, a unit shall consist of 2 paddles not less than 5 feet in length.

(h) *Oil, storm.* One gallon of vegetable, fish, or animal oil shall be provided in a suitable metal container so constructed as to permit a controlled distribution of oil on the water, and so arranged that it can be attached to the sea anchor.

(i) *Painter.* Painters shall be of manila rope not less than 2¾ inches in circumference and of a length not less than 3 times the distance between the deck on which the life rafts are stowed and the light draft of the vessel.

(j) *Provisions.* Two pounds of hard bread or its approved equivalent shall be provided for each person the life raft is certified to carry. The provisions shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in compartments providing suitable protection.

(k) *Rowlocks.* A unit consisting of 5 rowlocks attached to the life raft by separate chains and ready for immediate use, together with proper rowlock sockets so arranged as to provide 4 rowing positions and one steering position with the life raft floating either side up. Rowlocks and rowlock sockets are not required on life rafts for 6 persons or less.

(l) *Sea anchor.* The sea anchor shall be constructed of good quality canvas or other satisfactory material, and shall be not less than 2 feet in diameter.

(m) *Signals, distress.* A unit consisting of equipment as specified in one of the subparagraphs hereunder. Service use of this equipment shall be limited to 3 years from the date of manufacture.

(1) Twelve approved hand red flare distress signals in a watertight container and two approved floating orange smoke distress signals, constructed in accordance with Subparts 160.021 and 160.022 of Subchapter Q (Specifications) of this chapter; or

(2) Twelve approved hand red flare distress signals in a watertight container and 12 approved hand orange smoke distress signals, constructed in accordance with Subparts 160.021 and 160.037 of Subchapter Q (Specifications) of this chapter; or

(3) Twelve approved hand combination flare and smoke distress signals, constructed in accordance with Subpart 160.023 of Subchapter Q (Specifications) of this chapter.

(n) *Water.* One quart of water shall be provided for each person the life raft is certified to carry. The water shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in compartments providing suitable protection.

(o) *Water light.* The water light shall be of an approved type, constructed in accordance with Subparts 160.012 or 161.001 of Subchapter Q (Specifications) of this chapter. The water light shall be attached to the life raft by a 12-thread manila lanyard 3 fathoms in length.

§ 75.20–30 *Required equipment for life floats and buoyant apparatus.* (a) The life floats and buoyant apparatus for all vessels shall be equipped in accordance with Table 75.20–30 (a). For a description of the items contained in this table, and the units comprising the items, see the applicable paragraphs of § 75.20–35. The letter identification prefixing the item in the table corresponds to the paragraph designation in § 75.20–35.

TABLE 75.20–30 (a)

Letter identification	Item	Number required for each life float and buoyant apparatus		
		Ocean and coastwise	Great Lakes	Lakes, bays, and sounds; and rivers
a	Boathook	[1] 1	1	1
b	Life line	1	1	1
c	Paddles	[1] 4	4	4
d	Painter	1	1	1
e	Water light	[2] 1	1	None

[1] Buoyant apparatus need not be equipped with boathook or paddles.
[2] Equipment for 24 persons or less not required to have a water light.

§ 75.20–35 *Description of equipment for life floats and buoyant apparatus*—(a) *Boathook.* Boathooks shall be of the single hook ball point type. Boathook handles shall be of clear grained white ash, or equivalent, not less than 6 feet long and 1½ inches in diameter.

(b) *Life line.* The life line shall be properly secured around the sides and ends of the life float or buoyant apparatus, festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12-thread manila.

(c) *Paddles.* Paddles shall be not less than 5 feet long.

(d) *Painter.* (1) The painter for buoyant apparatus shall be of manila rope not less than 2 inches in circumference and of a length not less than 6 feet plus the distance between the deck on which the buoyant apparatus is stowed and the light draft of the vessel.

(2) The painter for life floats shall be of manila rope not less than 2¾ inches in circumference and of a length not less

than 3 times the distance between the deck on which the life floats are stowed and the light draft of the vessel.

(e) *Water light.* The water light shall be of an approved type, constructed in accordance with Subparts 160.012 or 161.001 of Subchapter Q (Specifications) of this chapter. The water light shall be attached to the life float or buoyant apparatus by a 12-thread manila lanyard 3 fathoms in length.

§ 75.20–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(a) (1) Except as specifically modified by this paragraph, the requirements of §§ 75.20–5 through 75.20–35 shall be complied with insofar as the number of items of equipment and the method of stowage of the equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 75.20–5 through 75.20–35 may be continued in service so long as they are maintained in a good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements in this part.

(2) Lifeboats previously approved without automatic drain plugs shall have two plugs or caps attached to the lifeboat by separate chains.

(3) Decked lifeboats shall have no drain holes or plugs, but shall be equipped with two bilge pumps.

(4) On vessels in ocean or coastwise service, unless other approved means are provided to achieve the same purpose, three ½-inch-diameter manila grab lines shall be fitted extending from gunwale to gunwale under the keel to enable persons to cling to and climb upon the upturned lifeboat. The ends of each grab line shall be securely attached to the side benches or other permanent part of the lifeboat and each grab line shall be made up with figure eight knots spaced approximately 18 inches apart in order to provide hand gripes. Means shall be provided for taking up any slack in the grab lines.

(5) Vessels required to have as lifeboat equipment 2 approved floating orange smoke signals may retain in substitution therefor either 12 approved hand orange smoke distress signals constructed in accordance with Subpart 160.037, or 12 approved combination flare and smoke distress signals constructed in accordance with Subpart 160.023 of Subchapter Q (Specification) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture, whereupon it shall be replaced with the required floating orange smoke signals.

SUBPART 75.25—DAVITS

§ 75.25–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.25–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.25–90.

§ 75.25–5 *General.* (a) All gravity and mechanical type davits shall be of an approved type, constructed in accordance with Subpart 160.032 of Subchapter Q (Specifications) of this chapter.

(b) Davits for lifeboats weighing in excess of 5,000 pounds when fully equipped (but without persons), shall be of the gravity type.

(c) All davits shall be so arranged that the lifeboats do not require lifting prior to being swung out.

(d) All davits and necessary gear shall be such as to meet the requirements for the installation test set forth in Subpart 75.35. The design, arrangements, and installation shall be such as to preclude undue delay in getting the lifeboats into the water. Where nested lifeboats are fitted, a period of 10 minutes will be allowed for launching all lifeboats on either side of the vessel.

(e) Radial davits, where permitted, shall comply with the following requirements:

(1) They shall be fitted with means to prevent them from being jerked from their sockets.

(2) They shall maintain a factor of safety of six based on the weight of the fully equipped and loaded lifeboat, except that the weight of the fully equipped lifeboat alone may be used where the lifeboat is launched before being loaded with passengers and crew.

(3) They shall be fitted with hand gear of sufficient power to insure that the boat can be turned out against a maximum list of 15 degrees.

(4) They shall be shop tested and show no permanent set or undue stress when subjected to a load equal to 2.2 times the working load. In addition, they shall be shop tested with a load equal to 1.1 times the weight of the fully equipped lifeboat with the davit set up to simulate a 15-degree list inboard, and it shall be determined that the hand gear can adequately handle the load in this condition.

(f) Davits shall be so disposed on one or more decks as to permit the lifeboats placed under them to be safely lowered without interference from the operation of any other davits.

§ 75.25–10 *Requirements for vessels in ocean or coastwise service.* (a) All vessels shall be fitted with a set of approved gravity or mechanical davits for each lifeboat carried. In exceptional cases, where in the opinion of the Commandant it is neither reasonable nor practicable to fit a set of davits for each lifeboat, authorization may be granted to nest the lifeboats one above the other: *Provided,* That there shall be fitted at least the minimum number of sets of davits required for the vessel by the International Convention for Safety of Life at Sea, 1948. In all cases, the number of nested lifeboats shall be kept to a minimum and it shall be ascertained by a test in the presence of an inspector that all lifeboats can be launched in the time prescribed by § 75.25–5 (d).

(b) All davit installations shall have 2 lifelines fitted to a davit span. The lifelines shall be of such length as to reach the water at the lightest sea going draft with the vessel listed 15 degrees either way.

§ 75.25–15 *Requirements for vessels in Great Lakes; lakes, bays, and sounds; or river service.* (a) All vessels shall be fitted with a set of approved gravity or mechanical davits for each lifeboat carried, except that on small vessels, radial type davits may be used if specifically approved by the Commandant.

§ 75.25–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 75.25–5 through 75.25–15 shall be complied with insofar as the number and general type of equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 75.23–5 through 75.25–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be made to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable specifications or requirements in this subpart.

(2) On vessels the keels of which were laid after September 1, 1941, all davits for lifeboats weighing in excess of 5,000 pounds when fully equipped (but without persons) shall be of the gravity type.

(3) In no case shall the number of sets of davits on vessels in ocean or coastwise service be less than that prescribed by the International Convention for the Safety of Life at Sea, 1929.

SUBPART 75.30—LIFEBOAT WINCHES

§ 75.30–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.30–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.30–90.

§ 75.30–5 *General.* (a) All lifeboat winches shall be of an approved type, constructed in accordance with Subpart 160.015 of Subchapter Q (Specifications) of this chapter.

(b) Where ice conditions are likely to be encountered, suitable fabric covers shall be provided for all lifeboat winches, so fitted over exposed mechanism, that ice formations may be readily broken adrift when necessary to operate the winch.

(c) Where lifeboat winches are used, wire falls shall be employed.

§ 75.30–10 *Number and type required.* (a) Lifeboat winches shall be fitted for each set of davits on all vessels where the height of the deck on which lifeboats are carried exceeds 20 feet from the lightest seagoing draft.

(b) Lifeboat winches shall be used in all cases where gravity type davits are employed.

(c) Lifeboat winches for use with gravity davits shall have grooved drums of such size that there will be only one layer of wire on the drums. Lifeboat winches for use with mechanical davits need not have grooved drums, and may be designed to take more than one layer of wire.

§ 75.30–15 *Installation.* (a) Lifeboat winches shall be so located that the operator can observe the movement of the lifeboat during the lowering operation. In addition, any electrical controls provided shall meet the requirements of § 111.65–40 of Subchapter J (Electrical Engineering) of this chapter.

(b) The lead of the falls to the lifeboat winches and length and size of wire shall be in accordance with Subpart 75.33.

(c) Lifeboat winches for use with nested lifeboats shall be provided with suitable means for rapidly retrieving the falls by hand power unless separate falls are provided for each lifeboat.

§ 75.30–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 75.30–5 through 75.30–15 shall be complied with insofar as the number and general type of equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 75.30–5 through 75.30–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. However, all new installations or major replacements shall meet the applicable specifications or requirements in this part.

(2) Vessels in river service need not comply with the requirements of § 75.30–10 (a).

(3) Existing arrangements previously approved, but not meeting the requirements of § 75.30–15 (a), need not be changed. However, new installations or major alterations should conform with such requirements where reasonable and practicable.

(4) Where lifeboat winches are used with gravity davits, the insulation shall comply with the requirements contained in § 160.015–3 (k), of Subpart 160.015 (Lifeboat Winches) of Subchapter Q (Specifications) of this chapter.

SUBPART 75.33—BLOCKS AND FALLS

§ 75.33–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.33–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of §75.33–90.

§ 75.33–5 *General.* (a) All blocks, falls, fairleads, padeyes, shackles, links, fastenings, etc., used in connection with lifeboat gear shall be designed with a minimum factor of safety of six, based on the maximum working load.

(b) Falls shall be of such length that the lifeboat may be lowered to the water with the vessel at its lightest draft and listed 15 degrees.

(c) Falls, where exposed and subject to damage or fouling, shall be suitably protected.

(d) Such blocks or other fittings shall be fitted as are necessary to permit the falls to lead fair in all positions to the davits.

(e) Means for lubrication shall be provided for all moving parts of blocks, sheaves, fairleads, etc.

§ 75.33–10 *Installations where lifeboat winches are used.* (a) All falls shall be of wire rope.

(b) Wire rope falls of 6 x 19 regular lay filler wire construction, prelubricated at the factory with suitable neutral wire rope lubricant, shall be accepted as standard. Any other wire rope, superior or equal to this minimum standard may be used.

(c) Not more than 2-part falls may be used, except in special cases where 3-part falls may be permitted by the Commandant.

(d) Where nested lifeboats are used, the lower block shall be of the nontoppling type unless separate falls are provided for each lifeboat.

(e) The lead sheaves to the drum shall be located so as to provide fleet angles of not more than 8 degrees for grooved drums and not more than 4 degrees for nongrooved drums. By fleet angle is meant the angle included between the wire rope from the lead sheave to the drum (or drum extended) when it is perpendicular to the axis of the drum, and the wire rope from the lead sheave to either extremity of the drum.

(f) Sheaves shall have a diameter at the base of the groove at least equal to 12 times the diameter of the wire rope.

§ 75.33–15 *Installations where lifeboat winches are not used.* (a) All falls shall be of manila rope or equivalent. Wire rope may not be used.

(b) All vessels of over 1,000 gross tons shall be provided with covered tubes, boxes, or reels for the stowage and protection of the falls, and cruciform bitts shall be provided for properly lowering the lifeboats. Vessels of 1,000 gross tons and less shall have the falls protected from ice and ready for immediate use, and shall be provided with suitable lowering bitts or cleats.

(c) Where nested lifeboats are used, separate blocks and falls shall be provided for each lifeboat.

(d) There shall be ample clearance between the cheeks of all blocks. The width between the cheeks shall be ½ inch greater than the diameter of new rope when rope of 3¾-inch circumference or greater is used. Blocks for smaller rope shall be designed with proportional clearances.

§ 75.33–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 75.33–5 through 75.33–15, as applicable, shall be complied with insofar as the general type of equipment is concerned. Existing equipment previously approved, but not meeting the detailed requirements of §§ 75.33–5 through 75.33–15, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be made to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable requirements in this subpart.

SUBPART 75.35—INSTALLATION OF LIFEBOATS, DAVITS, AND WINCHES

§ 75.35–1 *Application.* (a) The provisions of this subpart shall apply to all installations contracted for on or after November 19, 1952, except as set forth in § 78.17–60 (c) of this subchapter.

§ 75.35–5 *Tests and examinations.* (a) Upon completion of the installation of lifeboats, davits, or winches, tests and examinations as required by this section shall be made to the satisfaction of the inspector before the vessel may be navigated.

(b) The lifeboat shall be swung out from the chocks and lowered to the embarkation deck. At this point the lifeboat shall be loaded with deadweight equivalent to the number of persons allowed (165 pounds per person) together with weight of equipment, plus 10 percent of the total load including the weight of the lifeboat. No persons shall be permitted in the lifeboat while it is being loaded or lowered. The lifeboat shall then be lowered to the water and disengaged from the falls. If nested lifeboats are installed, both lifeboats shall be launched in the manner noted above. The following determinations shall be made:

(1) None of the equipment or parts thereof nor deck connections shall show signs of permanent set or excessive deflection.

(2) Mechanical and radial type davits shall be capable of being swung out without lifting the lifeboat.

(3) The falls shall be of sufficient length to lower the lifeboat to the light load line with the vessel heeled 15 degrees inboard.

(4) Where lifeboat winches are used, the following additional determinations shall be made:

(i) During lowering, the lifeboat shall be stoped at intervals of approximately 6 feet by the action of the counterweight alone. The counterweight shall be capable of stopping and holding the lifeboat. The brake action shall be smooth, but positive.

(ii) Brakes exposed to the weather shall be tested under the load conditions with the braking surfaces both wet and dry.

(iii) The governor brake shall be capable of controlling the speed of lowering of the fully equipped lifeboat with its complement of persons on board to not more than 120 feet per minute. In addition, the speed of lowering of the fully equipped lifeboat without its complement of persons shall be not less than 40 feet per minute. However, emergency lifeboats shall have a minimum lowering speed of 60 feet per minute in the fully equipped condition without persons aboard and a maximum lowering speed of 160 feet per minute in the fully equipped condition with the full complement of persons aboard.

(iv) If nested lifeboats are used, the hand operated quick return mechanism shall be tested. The action shall be easy enough for one man to recover the falls.

SUBPART 75.40—LIFE PRESERVERS, AND WOOD FLOATS

§ 75.40–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.40–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.40–90.

§ 75.40–5 *General.* (a) All life preservers shall be of an approved type, constructed in accordance with Subparts 160.002 through 160.005 of Subchapter Q (Specifications) of this chapter.

(b) All wood floats shall be a type constructed in accordance with Subpart 160.039 of Subchapter Q (Specifications) of this chapter.

§ 75.40–10 *Number and type required.* (a) Except as noted below, all vessels shall be provided with an approved type life preserver for each person carried and in addition shall be provided with a number of life preservers suitable for children equal to at least 10 percent of the persons carried.

(1) Steam vessels in river service, and barges carrying passengers while in tow of a steamer in other than ocean or coastwise service, may substitute approved wood floats for the approved type life preservers required above for each deck or steerage passenger.

(2) All river ferryboats shall be provided with an approved type life preserver (or wood float where same is permitted by Subparagraph (1) of this paragraph) for every 5 square feet of passenger deck surface on single deck ferryboats and for every 8.5 square feet of passenger deck surface on ferryboats having more than one passenger deck, such measurements to include all deck space in the team gangways at each end of the cabins. However, where the number of persons carried is less than the number of life preservers (or wood floats) required by these measurements, it shall only be required to provide one life preserver (or wood float when permitted) for each person carried.

§ 75.40–15 *Distribution, stowage, and notices*—(a) *Distribution.* (1) Life preservers, including those especially provided for children, shall be properly distributed throughout the staterooms, berthings, and other places convenient for passengers and crew. Wood floats, where permitted, shall be distributed in the most accessible places.

(b) *Stowage.* (1) Lockers, boxes, and closets in which life preservers are stowed shall not be capable of being locked, shall be plainly marked, and the life preservers contained therein shall be readily available.

(2) Life preservers stowed overhead shall be so supported that they can be quickly released and distributed among the passengers. Where life preservers are stowed at a height greater than 7 feet from the deck below, efficient means shall be provided for their immediate release and distribution to be operated by persons standing on the deck.

(c) *Notices.* (1) A printed notice, as described in §§ 78.47–47 and 78.47–50, shall be posted in every passenger cabin and stateroom and in conspicuous places about the decks, informing passengers of the location of life preservers and describing and illustrating the method of donning and adjusting them.

§ 75.40–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 75.40–5 through 75.40–15 shall be complied with insofar as the number of items of equipment and the method of stowage and notice is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 75.40–5 through 75.40–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements.

SUBPART 75.43—RING LIFE BUOYS AND WATER LIGHTS

§ 75.43–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.43–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.43–90.

§ 75.43–5 *General.* (a) All ring life buoys shall be of an approved type, constructed in accordance with Subpart 160.009 of Subchapter Q (Specifications) of this chapter.

(b) All water lights shall be of an approved type, constructed in accordance with Subparts 160.012 or 161.001 of Subchapter Q (Specifications) of this chapter.

§ 75.43–10 *Number required.* (a) The minimum number of approved 30-inch ring life buoys, and the minimum number of which shall have water lights attached, shall be in accordance with Table 75.43–10 (a).

(b) One of the ring life buoys on each side of the vessel shall have secured to it a line at least 15 fathoms in length.

TABLE 75.43–10 (a)

Length of vessel in feet	Ocean		All services other than ocean [1]	
	Minimum number of ring life buoys	Minimum number of ring life buoys in column 2 which shall have water lights attached	Minimum number of ring life buoys	Minimum number of ring life buoys in column 4 which shall have water lights attached
Column 1	Column 2	Column 3	Column 4	Column 5
Under 100	8	6	2	0
100 and under 200	8	6	4	2
200 and under 300	8	6	6	2
300 and under 400	12	6	12	4
400 and under 600	18	9	18	9
600 and under 800	24	12	24	12
800 and over	30	15	30	15

[1] Any mechanically propelled vessel on an international voyage shall meet the requirements for ocean service.

§ 75.43–15 *Distribution and securing.* (a) All ring life buoys shall be placed so as to be readily accessible to the persons on board, and their positions plainly indicated so as to be known to the persons concerned.

(b) The ring life buoys shall always be capable of being cast loose, and shall not be permanently secured in any way.

§ 75.43–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§75.43–5 through 75.43–15 shall be complied with insofar as the number of items of equipment and the method of stowage is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 75.43–5 through 75.43–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements in this subpart.

SUBPART 75.45—LINE-THROWING APPLIANCES

§ 75.45–1 *Application.* (a) The provisions of this subpart, with the exception of § 75.45–90, shall apply to all vessels on an international voyage and all other vessels of 150 gross tons and over certificated for ocean or coastwise service, contracted for on or after November 19, 1952. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.45–90.

§ 75.45–5 *General.* (a) Line-throwing appliances of the impulse-projected rocket type, and the equipment auxiliary thereto, shall be of an approved type, constructed in accordance with Subpart 160.040 of Subchapter Q (Specifications) of this chapter. The service use of rockets shall be limited to 4 years from date of manufacture.

(b) Line-throwing appliances of the shoulder gun type, and the equipment auxiliary thereto, shall be of an approved type, constructed in accordance

with Subpart 160.031 of Subchapter Q (Specifications) of this chapter.

§ 75.45–10 *Type required.* (a) All vessels shall be fitted with an approved line-throwing appliance of the impulse-projected rocket type. However, vessels of less than 500 gross tons and not on an international voyage may substitute a line-throwing appliance of the shoulder gun type.

§ 75.45–15 *Equipment for line-throwing appliances.* (a) The equipment enumerated in this paragraph shall be carried for impulse-projected rocket type line-throwing appliances. Except as noted, the equipment and the appliance shall be stowed together in a suitable case or box:

(1) Four rockets, two of which shall be of the buoyant type.

(2) Four primer-ejector cartridges.

(3) Four service lines, each 1,000 feet in length, of 7/32 inch to 9/32 inch diameter, of flax or manila, and having a breaking strength of at least 500 pounds, to be kept in faking boxes or on reels. These lines may be kept either in the box or case with the remainder of the equipment, or be stowed in an accessible location nearby.

(4) One cleaning brush, one can of oil, and twelve wiping patches.

(5) One set of instructions furnished by the manufacturer.

(6) One auxiliary line 1,500 feet of 3-inch circumference manila. This line may be kept either in the box or case with the remainder of the equipment or be stowed in an accessible location nearby.

(b) The equipment enumerated in this paragraph shall be carried for shoulder gun type line-throwing appliances. Except as noted, the equipment and the appliance shall be stowed together in a suitable case or box.

(1) Ten service projectiles.

(2) Twenty-five cartridges.

(3) Four service lines, each 400 feet in length, of 3/8 inch circumference flax or cotton and having a breaking strength of at least 250 pounds, to be kept in faking boxes or on reels. These lines may be kept either in the box or case with the remainder of the equipment or be stowed in an accessible location nearby.

(4) One cleaning rod with brush, one can of oil, and twelve wiping patches.

(5) One set of instructions furnished by the manufacturer.

(6) One auxiliary line, 500 feet of 3-inch circumference manila.

§ 75.45–20 *Accessibility.* (a) The line-throwing appliance and its equipment shall be kept easily and readily accessible and ready for use. No part of this equipment shall be used for any other purpose.

§ 75.45–25 *Service recommendations.* (a) In firing the line-throwing appliances, the operating instructions and safety precautions furnished by the manufacturer should be followed.

§ 75.45–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels of 150 gross tons and over in ocean or coastwise service, and vessels of any tonnage on an international voyage, contracted for prior to November 19, 1952, shall meet the requirements set forth in §§ 75.45–5 through 75.45–25. However, if a Lyle gun type line-throwing appliance is already in service on such vessel, it may be continued in use so long as it is in good and serviceable condition, but may not be replaced by a similar installation. Where Lyle guns are used, the following requirements shall be met:

(1) The equipment enumerated in this subparagraph shall be carried for Lyle gun type line-throwing appliances. The equipment and the gun shall be stowed together in a suitable case or box. If the case or box does not meet the requirements of Subpart 160.038 (Portable Magazine Chest) of Subchapter Q (Specifications) of this chapter, the powder shall be separately stowed in a chest meeting such requirements.

(i) Six service projectiles.

(ii) Eighteen bags (2½ ounces each) of black powder marked "One-half normal charge for Lyle gun, 2½ ounces black powder" in a nonferrous metal screw top container.

(iii) One approved firing attachment with accessories consisting of lanyard, wrench, washer to fit between barrel and shoulder of firing attachment, blank plug for screwing into gun when firing attachment is not in place, cartridge extractor, and 25 primers in a water-tight metal box.

(iv) Twenty-five paper wads.

(v) Four service lines, each 1,700 feet in length, of 7/32-inch to 9/32-inch diameter flax or manila, and having a breaking strength of at least 500 pounds. To be kept in faking boxes or on reels.

(vi) One ramrod, 1 wire brush, 1 can of light petrolatum, and 12 wiping patches.

(vii) One tapered wooden plug for muzzle of gun when not in use.

(viii) One set of instructions furnished by the manufacturer of the gun.

(ix) One auxiliary line, 1,500 feet of 3-inch circumference manila.

(2) Accessibility requirements are the same as § 75.45–20.

SUBPART 75.50—EMBARKATION AIDS

§ 75.50–1 *Application.* (a) The provisions of this subpart with the exception of § 75.50–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 75.50–90.

§ 75.50–5 *Ladders.* (a) Vessels certificated for ocean or coastwise service.

(1) All ladders required by this paragraph shall be of an approved type, constructed in accordance with Subpart 160.017 of Subchapter Q (Specifications) of this chapter.

(2) All vessels shall have an approved type ladder for each set of lifeboat davits. Such ladders shall be kept ready and convenient for use on the lifeboat deck, and shall reach from such deck to the vessel's light water line, no heel assumed.

(3) All vessels which normally employ a pilot shall have an approved type ladder for the use of the pilot in addition to the ladders required by subparagraph (2) of this paragraph.

(b) Vessels certificated for Great Lakes, lakes, bays, and sounds; or river service as follows:

(1) Vessels certificated for Great Lakes or lakes, bays, and sounds service shall be provided with a suitable ladder for each set of lifeboat davits. Such ladders shall be reversible and free from garment-entangling projections. They shall be kept ready and convenient for use on the lifeboat deck, and shall reach from such deck to the vessel's light water line, no heel assumed.

(2) Vessels certificated for river service shall be provided with suitable ladders to enable passengers to descend conveniently to the lifeboats.

§ 75.50–10 *Illumination for lifeboat launching operations.* (a) Provisions shall be made on all vessels on international voyages, and all other vessels where the lifeboat deck is more than 30 feet above the light water line, for readily and continuously available illumination from the vessel of lifeboats when alongside and in process of or immediately after being launched. Details of the illuminating system shall be in accordance with Subchapter J (Electrical Engineering) of this chapter.

§ 75.50–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 75.50–5 through 75.50–10 shall be complied with insofar as the number of items of equipment and the method of stowage is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements of §§ 75.50–5 through 75.50–10 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements in this subpart.

SUBPART 75.55—PORTABLE RADIO APPARATUS

§ 75.55–1 *Required on international voyage.* (a) Any vessel on an international voyage carrying less than 20 lifeboats shall be provided with a portable radio apparatus complying with the requirements of the Federal Communications Commission unless at least one lifeboat on each side of the vessel is fitted with a fixed radio installation. The apparatus shall be so designed that it may be used by an unskilled person. Such apparatus shall be kept in the radio room, chart room, or other suitable location ready to be moved to one or other of the lifeboats in the event of an emergency.

SUBPART 75.90—SHIP'S DISTRESS SIGNALS

§ 75.90–1 *Application.* (a) The provisions of this subpart shall apply to all vessels, except as specifically noted.

§ 75.90–5 *Vessels in ocean or coastwise service.* (a) All vessels in ocean and coastwise service shall carry within the pilothouse or on the navigator's bridge, 12 approved hand-held rocket-propelled parachute red flare distress signals contained in a portable watertight container, constructed in accordance with Subpart 160.036 of Subchapter Q (Specifications) of this chapter. Service use of the distress signals shall be limited to a period of 3 years from date of manufacture.

§ 75.90–10 *Vessels in Great Lakes service.* (a) All vessels of 150 gross tons and over in Great Lakes service shall carry within the pilothouse or on the navigator's bridge, 12 approved hand-held red flare distress signals contained in a portable watertight container constructed in accordance with Subpart 160.021 or 160.023 of Subchapter Q (Specifications) of this chapter. Service use of the distress signals shall be limited to a period of 3 years from date of manufacture.

PART 76—FIRE PROTECTION EQUIPMENT

Part 76 is amended to read as follows:

SUBPART 76.01—APPLICATION

Sec.
76.01–1 General.
76.01–5 Equipment installed but not required.

SUBPART 76.05—FIRE DETECTING AND EXTINGUISHING EQUIPMENT, WHERE REQUIRED

76.05–1 Fire detecting systems.
76.05–5 Manual alarm system.
76.05–10 Supervised patrol system.
76.05–15 Fire main system.
76.05–20 Fixed fire extinguishing systems.
76.05–25 Hand portable fire extinguishers and semiportable fire extinguisher systems.
76.05–30 Sand.

SUBPART 76.10—FIRE MAIN SYSTEM, DETAILS

76.10–1 Application.
76.10–5 Fire pumps.
76.10–10 Fire hydrants and hose.
76.10–15 Piping.
76.10–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.13—STEAM SMOTHERING SYSTEM, DETAILS

76.13–1 Application.
76.13–5 Quantity of steam required.
76.13–10 Piping.
76.13–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.15—CARBON DIOXIDE EXTINGUISHING SYSTEMS, DETAILS

76.15–1 Application.
76.15–5 Quantity, pipe sizes, and discharge rate.
76.15–10 Controls.
76.15–15 Piping.
76.15–20 Carbon dioxide storage.
76.15–25 Discharge outlets.
76.15–30 Alarms.
76.15–35 Inclosure openings.
76.15–40 Pressure relief.
76.15–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.17—FOAM EXTINGUISHING SYSTEMS, DETAILS

Sec.
76.17–1 Application.
76.17–5 Quantity of foam required.
76.17–10 Controls.
76.17–15 Piping.
76.17–20 Discharge outlets.
76.17–25 Additional protection required.
76.17–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.20—WATER SPRAY EXTINGUISHING SYSTEM, DETAILS

76.20–1 Application.
76.20–5 Capacity.
76.20–10 Controls.
76.20–15 Piping.
76.20–20 Discharge outlets.
76.20–25 Additional protection required.
76.20–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.23—MANUAL SPRINKLING SYSTEM, DETAILS

76.23–1 Application.
76.23–5 Zoning.
76.23–10 Quantity, pipe sizes, and discharge rates.
76.23–15 Controls.
76.23–20 Piping.
76.23–25 Sprinkler heads.
76.23–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.25—AUTOMATIC SPRINKLING SYSTEM, DETAILS

76.25–1 Application.
76.25–5 Zoning.
76.25–10 Size and arrangement of sprinkler heads and pipe sizes.
76.25–15 Pumps and water supply.
76.25–20 Pressure tank.
76.25–25 Controls.
76.25–30 Piping.
76.25–35 Operation and installation.
76.25–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.27—ELECTRIC FIRE DETECTING SYSTEM, DETAILS

76.27–1 Application.
76.27–5 Zoning.
76.27–10 Location and spacing of detectors.
76.27–15 Operation and installation.
76.27–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.30—PNEUMATIC FIRE DETECTING SYSTEM, DETAILS

76.30–1 Application.
76.30–5 Zoning.
76.30–10 Location and spacing of tubing.
76.30–15 Operation and installation.
76.30–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.33—SMOKE DETECTING SYSTEM DETAILS

76.33–1 Application.
76.33–5 Zoning.
76.33–10 Location and spacing of accumulators.
76.33–15 Piping.
76.33–20 Operation and installation.
76.33–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.35—MANUAL ALARM SYSTEM, DETAILS

Sec.
76.35–1 Application.
76.35–5 Zoning.
76.35–10 Location and spacing of manual alarm boxes.
76.35–15 Operation and installation.
76.35–90 Installations contracted for prior to November 19, 1952.

SUBPART 76.50—HAND PORTABLE FIRE EXTINGUISHERS AND SEMI-PORTABLE FIRE EXTINGUISHING SYSTEMS, DETAILS AND ARRANGEMENTS

76.50–1 Application.
76.50–5 Classification.
76.50–10 Location.
76.50–15 Spare charges.
76.50–90 Vessels contracted for prior to November 19, 1952.

SUBPART 76.60—AXES

76.60–1 Application.
76.60–5 Number required.
76.60–10 Location.

AUTHORITY: §§ 76.01–1 to 76.60–10 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4470, 4471, 4477, 4479, 4483, as amended, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 463, 464, 470, 472, 476, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 76.01—APPLICATION

§ 76.01–1 *General.* (a) The provisions of this part shall apply to all vessels except as specifically noted in this part.

§ 76.01–5 *Equipment installed but not required.* (a) Where fire detecting or extinguishing systems or equipment are not required, but are installed, the system or equipment and its installation shall meet the requirements of this part.

SUBPART 76.05—FIRE DETECTING AND EXTINGUISHING EQUIPMENT, WHERE REQUIRED

§ 76.05–1 *Fire detecting systems.* (a) Approved fire detecting systems shall be installed in locations as required by Table 76.05–1 (a) on the following vessels:

(1) Any vessel on an international voyage.

(2) Any vessel of more than 150 feet in length having sleeping accommodations for passengers.

(3) Any vessel of 150 feet or less in length, not on an international voyage, having sleeping accommodations for 50 or more passengers. Vessels in this category are not required to have a detecting system in the cargo spaces.

(b) The arrangement and details of the fire detecting systems shall be as set forth in Subparts 76.25 through 76.33.

§ 76.05–5 *Manual alarm system.* (a) An approved manual alarm system shall be installed in all areas, other than the main machinery spaces, which are normally accessible to the passengers or crew on any vessel having sleeping accommodations for passengers or any vessel on an international voyage.

(b) The arrangement and details of the manual alarm system shall be as set forth in Subpart 76.35.

TABLE 76.05-1 (a)

Space	Detecting systems	Fixed extinguishing systems
Safety areas		
Wheelhouse or fire-control room	None required [1]	None required.[1]
Stairway and elevator enclosures	do.[1]	Do.[1]
Communication corridors	do.[1]	Do.[1]
Lifeboat embarkation and lowering stations	do	Do.
Radio room	do.[1]	Do.[1]
Accommodations		
Staterooms, toilet spaces, isolated pantries, etc.	do.[1]	Do.[1]
Offices, lockers, and isolated storerooms	Electric, pneumatic, or automatic sprinkling.[1]	Do.[1]
Public spaces	None required with 20-minute patrol. Electric, pneumatic, or automatic sprinkling with 1 hour patrol.[1]	Do.[1]
Open decks or enclosed promenades	None required	Do.
Service spaces		
Galleys	do.[1]	Do.[1]
Main pantries	do.[1]	Do.[1]
Motion picture booths and film lockers	Automatic sprinkling [1 2]	Automatic sprinkling.[1 4]
Paint and lamp rooms	Smoke detecting [3]	Carbon dioxide or steam.
Inaccessible baggage, mail, and specie rooms and storerooms.	do	Do.
Accessible baggage, mail, and specie rooms and storerooms.	Electric, pneumatic, or automatic sprinkling.	None required.[1]
Refrigerated storerooms	None required	Do.
Carpenter, valet, photographic, and printing shops, sales rooms, etc.	Electric, pneumatic, or automatic sprinkling.	Do.[1]
Machinery spaces		
Coal fired boilers: Bunker and boiler space	None required	Do.
Oil fired boilers: Spaces containing oil fired boilers, either main or auxiliary, or their fuel oil units, valves, or manifolds in the line between the settling tanks and the boilers, and adjacent spaces to which oil can drain.	do	Carbon dioxide, foam, or water spray.[4]
Internal combustion and gas turbine propelling machinery spaces.	do	Carbon dioxide.[5]
Electric propulsive motors or generators of open type	do	None required.
Enclosed ventilating systems for motors and generators of electric propelling machinery.	do	Carbon dioxide (in ventilating system).[6]
Auxiliary spaces, internal combustion or gas turbine	do	Carbon dioxide. [7]
Auxiliary spaces, electric motors or generators	do	None required.
Auxiliary spaces, steam	do	Do.
Trunks to machinery spaces	do	Do.
Fuel tanks	do	Do. [8]
Cargo spaces		
Inaccessible during voyage, including trunks (excluding tanks).	Smoke detecting	Carbon dioxide or steam.
Accessible during voyage	Smoke detecting, electric, pneumatic or automatic sprinkling.	Automatic or manual sprinkling.
Vehicular deck (except where no overhead deck is installed).	None required	Manual sprinkling.
Cargo oil tanks	do	Carbon dioxide, foam, or steam.

[1] Vessels of 100 gross tons and over contracted for on or before May 27, 1936, and having combustible joiner work shall be fitted with an automatic sprinkling system, except in relatively incombustible spaces.

[2] Sprinkler heads may be attached to sanitary system provided electrical or pneumatic detecting is installed. Required only if nitro-cellulose film is used; if slow-burning film is used, an electrical or pneumatic detecting system may be substituted.

[3] On vessels contracted for prior to November 19, 1952, electric or pneumatic detecting may be substituted.

[4] Protection of auxiliary boilers, fuel oil units, valves, and manifolds not required on vessels contracted for prior to November 19, 1952.

[5] Not required on motorboats or vessels under 300 gross tons (except on an international voyage) using fuel with a flash point higher than 110 degrees F.

[6] Not required on vessels contracted for prior to November 19, 1952.

[7] Not required on vessels under 300 gross tons nor on vessels contracted for prior to November 19, 1952, except where fuel, including starting fuel, has a flash point of 110 degrees F. or less.

[8] Where fuel having a flash point of 110 degrees F. or lower is used, the space containing the fuel tanks shall be protected by a carbon dioxide system.

§ 76.05-10 ***Supervised patrol system.*** (a) An approved supervised patrol system shall be maintained in all spaces other than main machinery spaces and sleeping rooms, which are normally accessible to the passengers and crew on any vessel having sleeping accommodations for passengers or any vessel on an international voyage.

(b) The arrangement and details of the supervised patrol system shall be as set forth in § 78.30-10.

§ 76.05-15 ***Fire main system.*** (a) Fire pumps, hydrants, hose, and nozzles shall be installed on all vessels other than barges.

(b) The arrangement and details of the fire main system shall be as set forth in Subpart 76.10.

§ 76.05-20 ***Fixed fire extinguishing systems.*** (a) Approved fixed fire extinguishing systems shall be installed on all vessels other than barges as required by Table 76.05-1 (a).

(b) The arrangements and details of the fixed fire extinguishing systems shall be as set forth in Subparts 76.13 through 76.25.

§ 76.05-25 ***Hand portable fire extinguishers and semiportable fire extinguisher systems.*** (a) Approved hand portable fire extinguishers and semiportable fire extinguishing systems shall be installed on all vessels as set forth in Subpart 76.50.

§ 76.05-30 ***Sand.*** (a) On vessels of over 1,000 gross tons there shall be in each space containing oil fired boilers a metal receptacle containing not less than 10 cubic feet of sand, sawdust impregnated with soda, or other approved dry materials together with a scoop or shaker for distributing the same. On vessels of 1,000 gross tons or less, at least 5 cubic feet of such materials shall be similarly carried.

SUBPART 76.10—FIRE MAIN SYSTEM, DETAILS

§ 76.10-1 ***Application.*** (a) The provisions of this subpart, with the exception of § 76.10-90, shall apply to all fire main installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.10-90.

§ 76.10-5 ***Fire pumps.*** (a) Vessels shall be equipped with independently driven fire pumps in accordance with Table 76.10-5 (a).

TABLE 76.10-5 (a)

Gross tons		Minimum number of pumps		Hose and hydrant size, inches	Nozzle orifice size, inches	Length of hose, feet
Over	Not over	International voyage	Other			
------	100	II	[1] 1	[1] 1½	[1] ½	[1] 50
100	500	II	1	1½	⅝	50
500	1,500	2	II	1½	⅝	50
1,500	4,000	II	2	[2] 2½	[2] ⅞	[2] 50
4,000	-------	3	3	[2] 2½	[2] ⅞	[2] 50

[1] On vessels of 65 feet in length or less, not on international voyage, ¾-inch hose of good commercial grade together with a commercial garden hose nozzle may be used. The pump may be hand operated and the length of hose shall be sufficient to assure coverage of all parts of the vessel.

[2] 75 feet of 1½-inch hose and ⅝-inch nozzles may be used where specified by §76.10-10(b).

(b) Vessels on an international voyage shall have a minimum total fire pump capacity at least equal to ⅔ of the required total bilge pump capacity, but in no case less than that required by this section.

(c) Each pump shall be capable of delivering water simultaneously from the two highest outlets at a Pitot tube pressure of approximately 50 p. s. i. Where one or both of these outlets is a 1½-inch siamese fitting, both branches of the siamese fitting at each such outlet shall be utilized for the purpose of this requirement. Where ¾-inch hose is permitted by Table 76.10-5 (a), the Pitot tube pressure need be only 35 p. s. i.

(d) Fire pumps shall be fitted on the discharge side with relief valves set to relieve at 25 p. s. i. in excess of the pressure necessary to maintain the requirements of paragraph (c) of this section or 125 p. s. i., whichever is greater. Relief valves may be omitted if the pumps, operating under shutoff conditions, are not capable of developing a pressure exceeding this amount.

(e) Fire pumps shall be fitted with a pressure gauge on the discharge side of the pumps.

(f) Fire pumps may be used for other purposes provided at least one of the required pumps is kept available for use on the fire system at all times. Unless specifically approved by the Commandant, no branch lines shall be connected to the fire mains for other than fire and deck wash purposes. Other discharge

lines shall lead from a discharge manifold near the fire pump. In no case shall a pump having connection to an oil line be used as a fire pump.

(g) The total area of the pipes leading from a pump shall not be less than the discharge area of the pump.

(h) On vessels with oil fired boilers, either main or auxiliary, or with internal combustion propulsion machinery, where 2 fire pumps are required, they shall be located in separate spaces and the arrangement of pumps, sea connections, and sources of power shall be such as to insure that a fire in any one space will not put all of the fire pumps out of operation. However, in vessels of less than 300 feet in length, where it is shown to the satisfaction of the Commandant that it is unreasonable or impracticable to meet this requirement due to the size or arrangement of the vessel, or for other reasons, the installation of a total flooding carbon dioxide system may be accepted as an alternate method of extinguishing any fire which would affect the powering and operation of at least one of the required fire pumps.

§ 76.10–10 *Fire hydrants and hose.* (a) The size of fire hydrants, hose, and nozzles and the length of hose required shall be as noted in Table 76.10–5 (a).

(b) In lieu of the 2½-inch hose and hydrants specified in Table 76.10–5 (a), on vessels over 1,500 gross tons, the hydrants in interior locations may have siamese connections for 1½-inch hose. In these cases the hose shall be 75 feet in length, and only one hose will be required at each fire station; however, if all such stations can be satisfactorily served with 50-foot lengths, 50-foot hose may be used.

(c) On vessels over 1,000 gross tons there shall be at least one shore connection to the fire main available to each side of the vessel in an accessible location. Suitable cut-out valves and check valves shall be provided, and adapters shall, if practicable, be available where necessary to provide the shore connections with coupling threads corresponding to the shore fire lines.

(d) Fire hydrants shall be of sufficient number and so located that any part of the vessel, other than main machinery spaces, accessible to the passengers or crew while the vessel is being navigated and all cargo holds may be reached with at least two streams of water from separate outlets, at least one of which shall be from a single length of hose. For the purpose of this requirement, all watertight doors and all doors in main vertical zone bulkheads and stairway enclosures shall be closed, although hose ports may be installed in doors other than watertight doors and doors in main vertical zone bulkheads for the passage of the hose. In main machinery spaces, all portions at such spaces shall be capable of being reached by at least two streams of water, each of which shall be from a single length of hose from separate outlets; however, this requirement need not apply to shaft alleys containing no assigned space for the stowage of combustibles. Fire hydrants shall be numbered as required by § 78.47–20.

(e) All parts of the fire main located on exposed decks shall either be protected against freezing or be fitted with cut-out valves and drain valves so that the entire exposed parts of such piping may be shut off and drained in freezing weather. Except when closed to prevent freezing, such valves shall be sealed open.

(f) The outlet at the fire hydrant shall be limited to any position from the horizontal to the vertical pointing downward, so that the hose will lead horizontally or downward to minimize the possibility of kinking.

(g) Each fire hydrant shall be provided with a single length of hose with nozzle attached and a spanner. A suitable hose rack or other device shall be provided for the proper stowage of the hose. If the hose is not stowed in the open or behind glass so as to be readily seen, the enclosure shall be marked in accordance with § 78.47–20.

(h) Fire hose shall be connected to the outlets at all times. However, on open decks where no protection is afforded to the hose in heavy weather, or where the hose may be liable to damage from the handling of cargo the hose may be temporarily removed from the hydrant and stowed in an accessible nearby location.

(i) Fire hose shall not be used for any other purpose than fire extinguishing and fire drills.

(j) Hose nozzle requirements:

(1) All nozzles shall be of good grade bronze or equivalent metal.

(2) Where smooth bore type nozzles are used, they shall have an orifice of the size indicated in Table 76.10–5 (a).

(3) Where combination nozzles are used, they shall be approved, and shall be capable of producing a solid stream, a high velocity fog spray, or being shut off. In addition, an approved applicator with a low velocity water fog tip, which is capable of being attached directly to the nozzle or the hose, shall be provided for each nozzle. The detachable applicator shall be stowed adjacent to the fire hydrant, except where such combination nozzles are not required, in which case the applicator may be stowed at the discretion of the master. Unless a self-cleaning strainer is contained within the nozzle itself, and within the applicator where the applicator is attached directly to the hose, there shall be a self-cleaning strainer attached to the fire hydrant either directly or by means of a short length of hose.

(4) Except as noted in subparagraphs (5), and (6) of this paragraph, all hose nozzles shall be of either the smooth bore type or the approved type combination nozzle.

(5) On all vessels on an international voyage, and all other vessels of 1,000 gross tons and over, the hose attached to the hydrants in propulsion machinery spaces containing oil-fired boilers, internal combustion machinery, or oil fuel units shall be fitted with an approved combination nozzle. The applicator shall be not more than 6 feet in length.

(6) Where ¾-inch hose is permitted by Table 76.10–5 (a), a good commercial grade garden hose nozzle or equivalent will be accepted.

(7) Where approved combination nozzles are used, but are not required, the applicator with low velocity fog spray head and the self-cleaning strainer may be fitted, but will not be required.

(k) Fire hydrants, nozzles, and other fittings shall have threads to accommodate the hose connections noted in Paragraph (1) of this section.

(l) Fire hose and couplings requirements:

(1) Couplings shall be of brass, bronze, or other equivalent metal. National Standard Hose Threads shall be used for the 1½-inch and 2½-inch sizes, i. e., 11½ threads per inch for 1½-inch hose and 7½ threads per inch for 2½-inch hose.

(2) Unlined hose shall not be used in the machinery spaces.

(3) Where ¾-inch hose is permitted by Table 76.10–5 (a), the hose and couplings shall be of good commercial grade.

§ 76.10–15 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All distribution cut-off valves shall be marked as required by § 78.47–15.

§ 76.10–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 76.10–5 through 76.10–15 shall be complied with insofar as the number and general type of equipment is concerned. Existing equipment previously approved, but not meeting the applicable requirements of §§ 76.10–5 through 76.10–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be permitted to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable requirements in this part.

(2) All vessels shall be fitted with fire pumps, hoses, and nozzles in accordance with Table 76.10–90 (a) (2).

(3) When reasonable and practicable, where two or more fire pumps are required, they shall not all be located in the same space.

(4) The general requirements of §§ 76.10–5 (c) through (h), 76.10–10 (d) through (i), and 76.10–15 shall be complied with insofar as is reasonable and practicable.

TABLE 76.10–90 (a) (2)

Gross tons		Minimum number of pumps	Minimum hose and hydrant size, inches	Nozzle orifice size, inches	Length of hose, feet
Over	Not over				
------	100	1	[1] 1½	[1] 5/16	1 50
100	4,000	2	[2] 1½	[2] 7/8	[2] 50
4,000	------	3	[2] 1½	[2] 7/8	[2] 50

[1] On vessels of 65 feet in length or less, ¾-inch hose of good commercial grade together with a commercial garden hose nozzle may be used. The pump may be hand operated and the length of hose shall be sufficient to assure coverage of all parts of the vessel.

[2] May use 50 feet of 2½-inch hose with 7/8-inch nozzles for exterior stations. May use 75 feet of 1½-inch hose with 5/8-inch nozzles for interior station in which case such interior stations shall have siamese connections.

SUBPART 76.13—STEAM SMOTHERING SYSTEM, DETAILS

§ 76.13–1 *Application.* (a) Where a steam smothering system is installed, the provisions of this subpart, with the exception of § 76.13–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.13–90.

§ 76.13–5 *Quantity of steam required.* (a) Steam shall be available from main or auxiliary boilers to provide at least one pound of steam per hour for each 12 cubic feet of the gross volume of the largest compartment to be protected.

(b) Although separate piping shall be led to each cargo hold and 'tween deck, for the purpose of determining the amount of steam required, a cargo compartment will be considered as the space between adjacent watertight or firescreen bulkheads and from tank top or lowest deck to the deck head of the uppermost deck on which cargo may be carried. If a trunk extends beyond such deck, the trunk space shall be included. Tonnage openings shall be considered as sealed for this purpose.

(c) A steam pressure of at least 100 p. s. i. shall be available unless specifically approved otherwise.

§ 76.13–10 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) The distribution piping shall emanate from not more than three stations in easily accessible locations on the weather deck, and shall lead to the lower portion of each cargo hold, cargo 'tween deck, and other compartments protected. However, lines to paint lockers and similar small spaces may be taken from the nearest steam supply line.

(c) The distribution line to each compartment shall be fitted with a shut-off valve. The valve shall be marked as required by § 78.47–15 of this subchapter.

(d) The manifold steam supply line shall be fitted with a master valve at the manifold.

(e) Provisions shall be made for draining the manifold and distribution lines to prevent them from freezing.

(f) If located on the open deck, the distribution manifolds shall be suitably protected by an enclosing cabinet or casing. In any case, it shall be marked as required by § 78.47–17 of this chapter.

(g) Piping shall not be led into or through spaces accessible to the passengers or crew while the vessel is being navigated, with the exception of machinery spaces and corridors. However, in special cases, arrangements to run piping through such spaces may be specifically approved by the Commandant, provided all joints are welded, suitable expansion bends are provided, and all piping is extra heavy.

(h) Piping shall be used for no other purpose except that it may be incorporated with the fire detecting system, and where suitable provisions are made, it may be used for steaming out tanks.

(i) The minimum size and number of branches to the various spaces shall be as given in Table 76.13–10 (i). The distribution piping from the manifold to the branch lines shall have an area approximately equal to the combined areas of the branch lines served.

TABLE 76.13–10 (i)

Volume of spaces in cubic feet		Number of branches to spaces	Pipe size of each branch, inches
Over	Not over		
-------	500	1	¾
500	5,000	1	1
5,000	15,000	1	1¼
15,000	30,000	1	1½
30,000	60,000	2	1½
60,000	100,000	3	1½
100,000	190,000	4	1½

(j) The steam supply line from the boiler to any distribution manifold shall be of sufficient size to supply all the branch lines to the largest compartment and to all adjacent compartments.

§ 76.13–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to July 1, 1935, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original installation.

(2) The main pipes and their branches to the cargo compartments and similar spaces shall be not less than 1½-inch pipe size and shall emanate from not more than two stations in easily accessible locations. If located on the open deck, the distribution manifolds shall be suitably protected by an enclosing cabinet or casing which shall be marked as required by § 78.47–17 of this chapter. Each branch line shall have a valve at the manifold which shall be marked as required by § 78.47–15.

(3) Branches to paint lockers and similar small spaces may be taken from the nearest steam supply line and shall be not less than ¾-inch pipe size. The valve shall be marked as required by § 78.47–15 of this chapter.

(b) Installations contracted for on or after July 1, 1935, but prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials and facilities previously approved will be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, and alterations may be made to the same standard as the original installation.

(2) Steam shall be available from the main or auxiliary boilers to provide at least one pound of steam per hour for each 50 cubic feet of gross volume of the largest compartment protected. Where reasonable and practicable, the steam pressure shall be at least 100 p. s. i.

(3) The piping system shall meet the general requirements of § 76.13–10 (a) through (h) insofar as is reasonable and practicable.

(4) The minimum size of distribution piping and the number of branches to the various spaces shall be as given in Table 76.13–90 (b) (4) or by the following formula:

$$D=\sqrt{\frac{C}{30{,}000}} \qquad (1)$$

where:

D=Required diameter of pipe in inches.
C=Volume of compartment in cubic feet.

TABLE 76.13–90 (b) (4)

Volume of compartment in cubic feet		Number of branches to compartment	Pipe size in each branch, inches
Over	Not over		
-------	30,000	1	1
30,000	46,000	1	1¼
46,000	67,000	1	1½
67,000	94,000	2	1¼
94,000	135,000	2	1½
135,000	203,000	2	1½

(5) The minimum size of the steam supply line from the boiler to the distribution manifold shall be as given by the following formula:

$$D=\sqrt{\frac{C}{60{,}000}} \qquad (2)$$

where:

D=Diameter of pipe in inches.
C=Volume of all compartments in cubic feet.

SUBPART 76.15—CARBON DIOXIDE EXTINGUISHING SYSTEMS, DETAILS

§ 76.15–1 *Application.* (a) Where a carbon dioxide extinguishing system is installed, the provisions of this subpart, with the exception of § 76.15–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.15–90.

(b) The requirements of this subpart are based on a "high pressure system", i. e., one in which the carbon dioxide is stored in liquid form at atmospheric temperature. Details for "low pressure systems", i. e., those in which the carbon dioxide is stored in liquid form at a continuously controlled low temperature, may be specifically approved by the Commandant where it is demonstrated that a comparable degree of safety and fire extinguishing ability is achieved.

§ 76.15–5 *Quantity, pipe sizes, and discharge rate.* (a) The amount of carbon dioxide required for each space shall be as determined by the following paragraphs in this section.

(b) A separate supply of carbon dioxide need not be provided for each space protected. The total available supply shall be at least sufficient for the space requiring the greatest amount.

(c) Cargo space requirements:

(1) The number of pounds of carbon dioxide required for each space in cubic feet shall be equal to the gross volume of the space in cubic feet divided by 30.

(2) Although separate piping shall be led to each cargo hold and 'tween deck, for the purpose of determining the amount of carbon dioxide required, a

cargo compartment will be considered as the space between adjacent watertight or firescreen bulkheads and from the tank top or lowest deck to the deck head of the uppermost space on which cargo may be carried. If a trunk extends beyond such deck, the trunk volume shall be included. Tonnage openings shall be considered as sealed for this purpose.

(3) Branch lines to the various cargo holds and 'tween decks shall not be less than ¾ inch standard pipe size.

(4) No specific discharge rate need be applied to such systems.

(d) Enclosed ventilation systems for rotating electrical propulsion equipment requirements:

(1) The number of pounds of carbon dioxide required for the initial charge shall be equal to the gross volume of the system divided by 10 for systems having a volume of less than 2,000 cubic feet, and divided by 12 for systems having a volume of 2,000 cubic feet or more.

(2) The piping for the initial charge shall be in accordance with Table 76.15–5 (e) (3), and the discharge of the required amount shall be completed within two minutes.

(3) In addition to the above there shall be sufficient carbon dioxide available to permit delayed discharges of such quantity as to maintain at least a 25 percent concentration until the equipment can be stopped. If the initial discharge is such as to achieve this concentration until the equipment is stopped, no delayed discharge need be provided.

(4) The piping for the delayed discharge shall not be less than ½ inch standard pipe size, and no specific discharge rate need be applied to such systems. On small systems, this pipe may be incorporated with the initial discharge piping.

(e) Machinery spaces, paint lockers, tanks, and similar spaces, requirements:

(1) The number of pounds of carbon dioxide required for each space shall be equal to the gross volume of the space divided by the appropriate factor noted in Table 76.15–5 (e) (1). If fuel can drain from the compartment being protected to an adjacent compartment, or if the compartments are not entirely separate, the requirements for both compartments shall be used to determine the amount of carbon dioxide to be provided. The carbon dioxide shall be arranged to discharge into both such compartments simultaneously.

TABLE 76.15–5 (e) (1)

Gross volume of compartment, cubic feet		Factor
Over	Not over	
----------	500	15
500	1,600	16
1,600	4,500	18
4,500	50,000	20
50,000	----------	22

(2) For the purpose of the requirement of this paragraph, the volume of a machinery space shall be taken as exclusive of the normal machinery casing unless the boiler, internal combustion machinery, or fuel oil installations extend into such space in which case the volume shall be taken to the top of the casing or the next material reduction in casing area, whichever is lower.

(3) Branch lines to the various spaces shall be as noted in Table 76.15–5 (e) (3).

TABLE 76.15–5 (e) (3)

Maximum quantity of carbon dioxide required, pounds	Minimum nominal pipe size, inches	Maximum quantity of carbon dioxide required, pounds	Minimum nominal pipe size, inches
100	1½	2,500	2½
200	¾	4,450	3
300	1	7,100	3½
600	1¼	10,450	4
1,000	1½	15,000	4½
2,450	2		

(4) Distribution piping within the space shall be proportioned from the supply line to give proper distribution to the outlets without throttling.

(5) The number, type, and location of discharge outlets shall be such as to give a uniform distribution throughout the space.

(6) The total area of all discharge outlets shall not exceed 85 percent nor be less than 40 percent of the sum of the minimum areas of all the cylinder discharges or the area of the supply pipe, whichever is the smaller.

(7) The discharge of the required amount of carbon dioxide shall be complete within 2 minutes.

§ 76.15–10 *Controls.* (a) The carbon dioxide supply and all controls and valves for the operation of the system shall be outside the spaces protected and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. However, independent systems may be permitted in isolated small spaces such as emergency generator rooms, paint lockers, etc., in which case the cylinders may be inside the space, but the controls shall be outside the space, and a stop valve will not be required.

(b) Distribution piping to the various cargo spaces shall be controlled from not more than two stations. The station controlling the main machinery spaces shall be located as convenient as practicable to one of the main escapes from such spaces.

(c) Each branch line shall be fitted with an approved shut-off valve operable from the station which shall be marked as required by § 78.47–15. Such shut-off valves shall be kept closed at all times except to operate the particular system.

(d) The arrangements shall be such that the entire charge to any space, other than cargo spaces and delayed discharges to ventilating systems for electrical equipment, can be introduced into the space by the operation of one valve selecting the space, and one control for releasing at least the required amount of carbon dioxide. The controls shall be of an approved type and shall be located adjacent to the shut-off valve controls.

(e) Where provisions are made for the simultaneous release of a given amount of carbon dioxide, provisions shall also be made for manual release in the event of failure of the remote or automatic device.

(f) The distribution controls shall be suitably protected by an enclosing cabinet or casing which shall be marked as required by § 78.47–17 of this subchapter.

(g) Complete but simple instructions for the operation of the system shall be located in a conspicuous place at or near the releasing control device.

(h) If the space or enclosure containing the carbon dioxide supply or controls is to be locked, a key to the space or enclosure shall be in a break glass type box conspicuously located adjacent to the opening.

§ 76.15–15 *Piping.* (a) The piping, valves, and fittings shall have a bursting pressure of not less than 6,000 p. s. i.

(b) All piping, in nominal sizes not over ¾ inch, shall be at least Schedule 40 (standard weight), and in nominal sizes over ¾ inch, shall be at least Schedule 80 (extra heavy).

(c) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(d) A pressure relief valve or equivalent set to relieve between 2,400 and 2,800 p. s. i. shall be installed in the distributing manifold or such other location as to protect the piping in the event that all branch line shut-off valves are closed.

(e) All dead end lines shall extend at least 2 inches beyond the last orifice and shall be closed with cap or plug.

(f) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

(g) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture. Drains and dirt traps shall be located in accessible locations where possible.

(h) Piping shall be used for no other purpose except that it may be incorporated with the fire detecting system.

(i) Piping passing through living quarters shall not be fitted with drains or other openings within such spaces.

(j) Installation test requirements:

(1) Upon completion of the piping installation, and before the cylinders are connected, a pressure test shall be applied as set forth in this paragraph. Only carbon dioxide or other inert gas shall be used for this test.

(2) The piping from the cylinders to the stop valves in the manifold shall be subjected to a pressure of 1,000 p. s. i. With no additional gas being introduced to the system, it shall be demonstrated that the leakage of the system is such as not to permit a pressure drop of more than 150 p. s. i. per minute for a 2-minute period.

(3) The individual branch lines to the various spaces protected shall be subjected to a test similar to that described in the preceding subparagraph with the exception that the pressure used shall be 600 p. s. i. in lieu of 1,000 p. s. i. For

the purpose of this test, the distribution piping shall be capped within the space protected at the first joint ahead of the nozzles.

(4) In lieu of the tests prescribed in the preceding subparagraphs in this paragraph, small independent systems protecting spaces such as emergency generator rooms, lamp lockers, etc., may be tested by blowing out the piping with air at a pressure of at least 100 p. s. i.

§ 76.15–20 *Carbon dioxide storage.* (a) The room for the carbon dioxide storage supply shall be properly ventilated and shall be so located and designed that the anticipated ambient temperature will not exceed 130 degrees F.

(b) Cylinders shall be securely fastened and supported, and, where necessary, protected against injury.

(c) Cylinders shall be so mounted as to be readily accessible and capable of easy removal for recharging and inspection. Provisions shall be available for weighing the cylinders.

(d) Where subject to moisture, cylinders shall be so installed as to provide a space of at least 2 inches between the flooring and the bottom of the cylinders.

(e) Cylinders shall be mounted in an upright position or inclined not more than 30 degrees from the vertical. However, cylinders which are fitted with flexible or bent syphon tubes may be inclined not more than 80 degrees from the vertical.

(f) Where check valves are not fitted on each independent cylinder discharge, plugs or caps shall be provided for closing outlets when cylinders are removed for inspection or refilling.

(g) All cylinders used for storing carbon dioxide shall be fabricated, tested, and marked in accordance with the regulations of the Interstate Commerce Commission as noted in § 147.04–1 of Subchapter N (Explosives or Other Dangerous Articles or Substances and Combustible Liquids on Board Vessels) of this chapter.

§ 76.15–25 *Discharge outlets.* (a) Discharge outlets shall be of an approved type.

§ 76.15–30 *Alarms.* (a) Spaces which are protected by a carbon dioxide extinguishing system and are normally accessible to persons on board while the vessel is being navigated, other than paint and lamp lockers and similar small spaces, shall be fitted with an approved audible alarm in such spaces which will be automatically sounded when the carbon dioxide is admitted to the space. The alarm shall be conspicuously and centrally located and shall be marked as required by § 78.47–9.

§ 76.15–35 *Inclosure openings.* (a) Where mechanical ventilation is provided for spaces other than cargo and similar spaces which are protected by a carbon dioxide extinguishing system, provisions shall be made so that the ventilation system is automatically shutdown with the operation of the system to that space.

(b) Where natural ventilation is provided for spaces protected by a carbon dioxide extinguishing system, provisions shall be made for easily and effectively closing off the ventilation.

(c) Means shall be provided for closing all openings to the space protected from outside such space. In this respect, relatively tight doors, shutters, or dampers shall be provided for openings in the lower portion of the space. The construction shall be such that openings in the upper portion of the space can be closed off either by permanently installed means or by the use of canvas or other material which is normally carried by the vessel.

§ 76.15–40 *Pressure relief.* (a) Where necessary, relatively tight compartment such as refrigeration spaces, paint lockers, etc., shall be provided with suitable means for relieving excessive pressure accumulating within the compartment when the carbon dioxide is injected.

§ 76.15–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.15–5 through 76.15–40 insofar as is reasonable and practicable, with the exception of § 76.15–5 (e) (1) through (3) covering spaces other than cargo spaces, which systems may be installed in accordance with subparagraphs (3) through (6) of this paragraph.

(3) In boiler rooms, the bilges shall be protected by a system discharging principally below the floor plates. Perforated pipe may be used in lieu of discharge nozzles for such systems. The number of pounds of carbon dioxide shall be equal to the gross volume of the boiler room taken to the top of the boilers divided by 36. In the event of an elevated boiler room which drains to the machinery space, the system shall be installed in the engine room bilge and the gross volume shall be taken to the flat on which the boilers are installed.

(4) In machinery spaces where main propulsion internal combustion machinery is installed, the number of pounds of carbon dioxide required shall be equal to the gross volume of the space taken to the underside of the deck forming the hatch opening divided by 22.

(5) In miscellaneous spaces other than cargo or main machinery spaces, the number of pounds of carbon dioxide required shall be equal to the gross volume of the space divided by 22.

(6) Branch lines to the various spaces, other than cargo and similar spaces, shall be as noted in Table 76.15–90 (a) (6). This table is based on cylinders having discharge outlets and siphon tubes of ⅜-inch diameter.

TABLE 76.15–90 (a) (6)

Number of cylinders		Nominal pipe size	
Over	Not over	Inches	Type
----	1	½	Standard.
2	3	¾	Do.
4	6	1	Extra heavy.
6	12	1¼	Do.
12	16	1½	Do.
16	27	2	Do.
27	39	2½	Do.
39	60	3	Do.
60	80	3½	Do.
80	104	4	Do.
104	165	5	Do.

SUBPART 76.17—FOAM EXTINGUISHING SYSTEMS, DETAILS

§ 76.17–1 *Application.* (a) Where a foam extinguishing system is installed, the provisions of this subpart, with the exception of § 76.17–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.17–90.

§ 76.17–5 *Quantity of foam required—*(a) *Area protected.* (1) For machinery and similar spaces, the system shall be so designed and arranged as to spread a blanket of foam over the entire tank top or bilge of the space protected. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(2) Where an installation is made to protect an oil fired boiler installation on a flat which is open to or can drain to the lower engine room or other space, both the flat and the lower space shall be protected simultaneously. The flat shall be fitted with suitable coamings on all openings other than deck drains to properly restrain the oil and foam at that level. Other installations of a similar nature will be considered in a like manner.

(3) Where a system is installed to protect a tank, it shall be so designed and arranged as to spread a blanket of foam over the entire liquid surface of the tank within the range of usual trim. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(b) *Rate of application.* (1) For spaces other than tanks, the rate of discharge to foam outlets protecting the hazard shall be at least as set forth in this subparagraph.

(i) For chemical foam systems with stored "A" and "B" solutions, a total of at least 1.6 gallons per minute of the two solutions shall be discharged for each 10 square feet of area protected.

(ii) For other types of foam systems, the water rate to the dry powder generators or air foam production equipment shall be at least 1.6 gallons per minute for each 10 square feet of area protected.

(2) For tanks, the rate of discharge to foam outlets protecting the hazard shall be as set forth in subparagraph (1) of this paragraph, except that the value of 1 gallon per minute shall be substituted

in both cases for the value of 1.6 gallons per minute.

(c) *Supply of foam producing material.* (1) There shall be provided a quantity of foam producing material sufficient to operate the equipment at the discharge rate specified in paragraph (b) of this section for a period of at least 3 minutes for spaces other than tanks, and for at least 5 minutes for tanks.

(2) A separate supply of foam agent need not be provided for each space protected. The total available supply shall be at least sufficient for the space requiring the greatest amount.

(3) Where pumps are required, the water supply shall be from outside the space protected and shall in no way be dependent upon power from the space protected.

§ 76.17–10 *Controls.* (a) The foam agent, its container, and all controls and valves for the operation of the system shall be of an approved type.

(b) The foam agent container and all controls and valves for the operation of the system shall be outside the space protected and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. The control space shall be as convenient as practicable to one of the main escapes from spaces protected, and shall be marked as required by § 78.47–17 of this subchapter. Where pumps are required, it shall not be necessary that they be started from the control space.

(c) Complete, but simple instructions for the operation of the system shall be located in a conspicuous place at or near the controls.

(d) The valves to the various spaces served shall be marked as required by § 78.45–15 of this chapter.

§ 76.17–15 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(c) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

(d) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

(e) Piping shall be used for no other purpose.

76.17–20 *Discharge outlets.* (a) Discharge outlets shall be of an approved type.

§ 76.17–25 *Additional protection required.* (a) In order that any residual fires above the floor plates may be extinguished when a foam system is installed for the protection of spaces other than tanks, at least 2 fire hydrants, in additional to those required for the machinery space by Subpart 76.10, shall be installed outside of the machinery space entrances. Such hydrants shall be fitted with sufficient hose so that any part of the machinery space may be reached with at least 2 streams of water, and each hose shall be equipped with an approved combination nozzle, applicator, and self-cleaning strainer as described in § 76.10–10 (j) (3).

§ 76.17–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.17–5 through 76.17–20, with the exception of § 76.17–5 (a) (2), insofar as is reasonable and practicable. A 6-inch blanket of foam in 5 minutes for tanks and 3 minutes for other spaces will be considered as meeting the requirements of § 76.17–5.

SUBPART 76.20—WATER SPRAY EXTINGUISHING SYSTEM, DETAILS

§ 76.20–1 *Application.* (a) Where a water spray extinguishing system is installed, the provisions of this subpart, with the exception of § 76.20–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.20–90.

§ 76.20–5 *Capacity.* (a) The capacity and arrangement shall be such as to effectively blanket the entire area of the tank top. The rate of discharge and the arrangement of piping and nozzles shall be such as to give a uniform distribution over the entire area protected.

(b) Where an installation is made to protect an oil fired boiler installation on a flat which is open to or can drain to the lower engine room or other space, both the flat and the lower space shall be protected simultaneously. The flat shall be fitted with suitable coamings to all openings other than deck drains to properly restrain the oil and water at that level. Other installations of a similar nature will be considered in a like manner.

(c) The water supply shall be from outside the space protected and shall in no way be dependent upon power from the space protected. The pump supplying water for the system shall either be reserved exclusively for the system or it may be one of the fire pumps, provided the capacity of the fire pump as set forth in Table 76.10–5 (a) is increased by the required capacity of the system.

§ 76.20–10 *Controls.* (a) The controls and valves for the operation of the system shall be outside the space protected and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. The control space shall be located as convenient as practicable to one of the main escapes from the spaces protected, and it shall be marked as required by § 78.47–17 of this subchapter. It shall not be necessary to start the pumps from the control space.

(b) Complete, but simple instructions for the operation of the system shall be located in a conspicuous place at or near the controls.

(c) The valves to the various spaces shall be marked as required by § 78.47–15 of this subchapter.

§ 76.20–15 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(c) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

(d) Drains, strainers, and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

(e) Piping shall be used for no other purpose.

§ 76.20–20 *Discharge outlets.* (a) Discharge outlets shall be of an approved type.

§ 76.20–25 *Additional protection required.* (a) In order that any residual fires above the floor plates may be extinguished when a water spray system is installed, at least 2 fire hydrants, in addition to those required for the machinery space by Subpart 76.10, shall be installed outside the machinery space entrances. Such hydrants shall be fitted with sufficient hose so that any part of the machinery space may be reached with at least 2 streams of water, and each hose shall be equipped with an approved combination nozzle, applicator, and self-cleaning strainer as described in § 76.10–10 (j) (3).

§ 76.20–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.20–5 through 76.20–20, with the exception of § 76.20–5 (b), insofar as is reasonable and practicable.

SUBPART 76.23—MANUAL SPRINKLING SYSTEM, DETAILS

§ 76.23–1 *Application.* (a) Where a manual sprinkling system is installed, the provisions of this subpart, with the exception of § 76.23–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.23–90.

§ 76.23–5 *Zoning.* (a) Separate zones may be used for each deck, and on any particular deck, spaces separated by "A" or "B" Class bulkheads may be separately zoned.

(b) On any particular deck, large common areas may be zoned in accordance with Table 76.23–5 (b). All such zones within one common area shall be of approximately the same size. Zones of this type shall overlap in such a manner that the end sprinkler heads of both adjoining zones will cover the identical area.

TABLE 76.23–5 (b)

Square feet of common deck area		Maximum number of zones
Over	Not over	
--------	800	1
800	1,800	2
1,800	3,000	3
3,000	5,000	4
5,000	9,000	5
9,000	16,000	6
16,000	30,000	7
30,000	----------	8

§ 76.23–10 *Quantity, pipe sizes, and discharge rates.*—(a) *General.* (1) The system shall be so designed and arranged that the overhead is effectively sprayed and all portions of the deck are covered. The capacity shall be such that at least 12 gallons of water per minute are applied to each 100 square feet of deck area.

(2) Piping, fittings, sprinkler heads, and pumps installed in accordance with the remainder of this section will be considered as meeting the above requirements. If alternate sizes or arrangements are used, it shall be demonstrated that these minimum requirements have been met.

(b) *Sprinkler heads.* (1) Three-eight inch open type sprinkler heads shall be used. Sprinkler heads shall be so arranged that no portion of the overhead is more than 7 feet from a sprinkler head.

(c) *Pipe sizes.* (1) The various pipe sizes shall be in proportion to the number of heads served. Minimum pipe sizes shall be as given in Table 76.23–10 (c).

TABLE 76.23–10 (c)

Number of ⅜ inch heads served		Minimum nominal pipe sizes, inches
Over	Not over	
----	1	¾
1	2	1
2	4	1¼
4	6	1½
6	12	2
12	18	2½
18	30	3
30	46	3½
46	66	4
66	120	5

(d) *Fire pumps.* (1) The fire pumps may be used for the sprinkling system provided there is sufficient total capacity to operate the largest zone of the sprinkling system with a Pitot tube pressure of at least 15 p. s. i. at all heads and at the same time to deliver water from the two highest fire hose outlets in a manner similar to that described in § 76.10–5 (c). In addition, on vessels over 750 gross tons, there shall be sufficient pumping capacity to also operate the second largest zone.

§ 76.23–15 *Controls.* (a) The controls for the system shall be outside the spaces protected, and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. The control space shall be marked as required by § 78.47–15 of this subchapter. It shall not be necessary to start the pumps from the control space.

(b) Distribution piping to the various zones shall be controlled from one station. Each branch line to the various zones shall be fitted with a stop valve which shall be marked as required by § 78.47–15 of this subchapter.

§ 76.23–20 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved by the Commandant.

(c) All piping, valves, fittings, and sprinkler heads shall be securely supported, and where necessary, protected against injury.

(d) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

(e) Piping shall be used for no other purpose.

§ 76.23–25 *Sprinkler heads.* (a) Sprinkler heads shall be of an approved type.

§ 76.23–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and replacements may be made to the same standards as the original installation.

(2) The details of the system shall be in general agreement with §§ 76.23–5 through 76.23–25 insofar as is reasonable and practicable. Existing piping, pumping facilities, and sprinkler heads or perforated pipes may be retained provided all portions of the overhead are effectively sprayed and all portions of the deck are covered.

SUBPART 76.25—AUTOMATIC SPRINKLING SYSTEM, DETAILS

§ 76.25–1 *Application.* (a) Where an automatic sprinkling system is installed, the provisions of this subpart, with the exception of § 76.25–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.25–90.

§ 76.25–5 *Zoning.* (a) The automatic sprinkling system shall be divided into separate zones to restrict the area covered by any particular alarm signal.

(b) No sprinkling zone shall contain more than 250 sprinkler heads.

(c) The sprinkling zone may cover more than one deck, in which case, the boundaries shall be maintained in a vertical line insofar as is reasonable and practicable. The boundaries of the zone shall be coincident with bulkheads of Class "A" construction such as main vertical zone or watertight bulkheads.

(d) Spaces in different main vertical zones shall not be included in the same sprinkling zone.

§ 76.25–10 *Size and arrangement of sprinkler heads and pipe sizes.*—(a) *General.* (1) The system shall be so designed and arranged that the overhead is effectively sprayed and that all portions of the deck are covered.

(2) One-half inch sprinkler heads shall be used. Sprinkler heads shall be so arranged that no portion of the overhead or vertical projection of the deck is more than 7 feet from a sprinkler head.

(b) *Pipe sizes.* (1) The sizes of branch lines, single cross mains, feed mains, and risers shall be in proportion to the number of sprinkler heads served. The minimum pipe sizes shall be as given in Table 76.25–10 (b) (1).

TABLE 76.25–10 (b) (1)

Minimum nominal pipe size, inches	Maximum number of heads served	
	Vessels whose construction is more combustible than that set forth in §§ 72.05–5 through 72.05–60	Vessels constructed in general agreement with §§ 72.05–5 through 72.05–60
1	2	3
1¼	3	3
1½	5	5
2	10	10
2½	20	40
3	40	250
3½	65	----------
4	100	----------
5	160	----------
6	250	----------

(2) If a complete loop cross main is employed, the size of such cross main shall be in proportion to the number of sprinkler heads served. The minimum pipe sizes shall be as given in Table 76.25–10 (b) (2). The entire loop shall be of the same size pipe.

TABLE 76.25–10 (b) (2)

Minimum nominal pipe size inches	Maximum number of heads served	
	Vessels whose construction is more combustible than that set forth in §§ 72.05–5 through 72.05–60	Vessels constructed in general agreement with §§ 72.05–5 through 72.05–60
1	5	5
1¼	9	9
1½	13	13
2	22	30
2½	40	80
3	80	250
3½	130	----------
4	250	----------

§ 76.25–15 *Pumps and water supply.* (a) An automatically controlled pump shall be provided to supply the sprinkling system and shall be used for no other purpose. The size and capacity of the pump shall be governed by the zone having the greatest capacity need for any one deck, and shall be suitable to operate at least the number of heads noted in Table 76.25–15 (a) with a Pitot tube pressure of at least 15 p. s. i. at all heads (approximately 20 GPM per head). There shall also be sufficient pumping capacity available, either from the automatic pump, the fire pumps, or other source, so that in conjunction with the automatic pump the total number of heads noted in Table 76.25–15 (a) may be operated with the same efficiency as noted above, and at the same time to deliver water from the two highest fire hose outlets in a manner similar to that described in § 76.10–5 (c). Intermediate values may be obtained by interpolation.

TABLE 76.25–15 (a)

Maximum number of heads on one deck in one zone	Number of heads automatic pump to supply	Number of heads additional pumps to supply
5	5	----------
10	10	----------
20	10	10
30	12	16
40	15	18
50	15	25
60	20	25
80	20	30
100	20	40
130	20	50
150	20	60
200	20	75
250	20	100

§ 76.25–20 *Pressure tank.* (a) A pressure tank or other suitable means shall be installed to permit early action of the system pending the starting of the pump. Sufficient fresh water shall be carried in the tank to fill the piping of the largest zone, and in addition, force out at least 200 gallons at the least effective head in the zone at a Pitot tube pressure of at least 15 p. s. i. Suitable check valves shall be installed to prevent salt water from entering the pressure tank, and low water and low pressure alarms shall be fitted.

§ 76.25–25 *Controls*—(a) The controls for the system shall be outside the spaces protected, and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. The control space shall be marked as required by § 78.47–17 of this subchapter.

(b) Each supply line to the various zones shall be fitted with a stop valve which shall be marked as required by § 78.47–15 of this subchapter. These valves shall be normally open, and shall indicate by an alarm if they are closed.

§ 76.25–30 *Piping.* (a) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved by the Commandant.

(b) All piping, valves, fittings, and sprinkler heads shall be securely supported, and, where necessary, protected against injury.

(c) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

(d) Piping shall be used for no other purpose.

§ 76.25–35 *Operation and installation.* (a) The system shall be so arranged and installed that a fire in any of the protected spaces will open the affected sprinkler heads. Water from the pressure tank shall be immediately available to the affected sprinkler head and before the supply from the pressure tank is exhausted, the sprinkler pump shall be automatically started and shall supply the system until manually shut off. Suitable test stations shall be installed in each zone to test the operation of the system.

(b) The system shall be so arranged and installed that the presence of a fire in any of the protected spaces will automatically be registered visibly and audibly in the pilothouse or fire control station. The visible notice shall automatically indicate the zone in which the alarm originated. On vessels over 150 feet in length, there shall also be an audible alarm in the engine room.

(c) There shall be at least two sources of power for the sprinkler pumps, air compressors, and alarms. When electric sprinkler pumps are used, they shall be capable of being operated from the emergency switchboard by a feeder reserved solely for that purpose. There shall be no switches in the circuit other than at the switchboard. This switch shall be clearly labeled and shall be normally kept closed.

(d) Where subject to freezing, sprinkler systems shall be of the dry pipe type.

(e) The sprinkler heads, the cabinet, alarms, dry valves and actuating mechanisms shall be of an approved type.

(f) In general, the sprinkler heads shall be rated not lower than 135 degrees F. nor higher than 165 degrees F. However, in spaces where a high ambient temperature may be expected, sprinkler heads rated at 212 degrees F. shall be used.

(g) The automatic sprinkling system and all its components shall be used for no other purpose.

(h) All wiring and electrical circuits and equipment shall meet the applicable requirements of Subchapter J (Electrical Engineering) of this chapter.

(i) All piping, valves, fittings, pressure tanks, etc., shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(j) A framed chart or diagram shall be installed in the wheelhouse or control station adjacent to the detecting cabinet indicating the location of the various detecting zones and giving instructions for the operation, maintenance, and testing of the system. This chart, or a separate card or booklet to be kept near the chart, shall have tabulated spaces for the date and signature of the licensed officer of the vessel who shall witness or conduct the periodic tests.

(k) The audible alarms shall be identified as required by § 78.47–13 of this subchapter.

§ 76.25–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph, and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and replacements may be made to the same standards as the original installation.

(2) The details of the system shall be in general agreement with §§ 76.25–5 through 76.25–35 insofar as is reasonable and practicable. Existing piping, pumping facilities, sprinkler heads, and operating devices may be retained provided a reasonable coverage of the spaces protected is assured.

SUBPART 76.27—ELECTRIC FIRE DETECTING SYSTEM, DETAILS

§ 76.27–1 *Application.* (a) Where an electric fire detecting system is installed, the provisions of this subpart, with the exception of § 76.27–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.27–90.

§ 76.27–5 *Zoning.* (a) The fire detecting system shall be divided into separate zones to restrict the area covered by any particular alarm signal.

(b) All spaces in a fire detecting zone shall be accessible from one to another without leaving the deck involved. All doors in watertight subdivision bulkheads and main vertical zone bulkheads shall be assumed closed for the purpose of this requirement.

(c) The fire detecting zone shall not include spaces on more than one deck, except:

(1) Adjacent and communicating spaces on different decks in the ends of the vessel having a combined ceiling area of not more than 3,000 square feet.

(2) Isolated rooms or lockers in such spaces as mast houses, wheelhouse top, etc., which are easily communicable with the area of the fire-detecting circuit to which they are connected.

(3) Systems with indicators for individual spaces.

(d) The fire detecting zone shall not contain more than 50 protected rooms or spaces.

§ 76.27–10 *Location and spacing of detectors.* (a) The detectors shall be located close to the overhead in the space protected. Where liable to physical damage, the detector shall be suitably protected.

(b) Unless specifically approved otherwise, no spot on the overhead of a protected space shall be more than 10 feet from a detector. Where beams or girders extend below the ceiling, or where the ceiling is installed at more than one level, the detectors shall be so located as to be most effective.

§ 76.27–15 *Operation and installation.* (a) The system shall be so arranged and installed that the presence of a fire in any of the protected spaces will be registered visibly and audibly in the pilot-

house or fire control station. The visible notice shall automatically indicate the zone in which the alarm originated. On vessels over 150 feet in length, there shall also be an audible alarm in the engine room.

(b) The detectors, the detecting cabinet and alarms shall be of an approved type.

(c) In general, the detectors, shall be rated not lower than 135 degrees F. and not higher than 165 degrees F. However, in spaces where a high ambient temperature may be expected, detectors shall be rated not lower than 175 degrees F. and not higher than 225 degrees F.

(d) The fire detecting system shall be used for no other purpose, except that it may be incorporated with the manual alarm system.

(e) All wiring and electrical circuits and equipment shall meet the applicable requirements of Subchapter J (Electrical Engineering) of this chapter.

(f) A framed chart or diagram shall be installed in the wheelhouse or control station adjacent to the detecting cabinet indicating the location of the various detecting zones and giving instructions for the operation, maintenance, and testing of the system. This chart, or a separate card or booklet to be kept near the chart, shall have tabulated spaces for the date and signature of the licensed officer of the vessel who shall witness or conduct the periodic tests.

(g) The audible alarms shall be identified as required by § 78.47–13 of this subchapter.

§ 76.27–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and equipment previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph, and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.27–5 through 76.27–15 insofar as is reasonable and practicable.

SUBPART 76.30—PNEUMATIC FIRE DETECTING SYSTEM, DETAILS

§ 76.30–1 *Application.* (a) Where a pneumatic fire detecting system is installed, the provisions of this subpart, with the exception of § 76.30–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.30–90.

§ 76.30–5 *Zoning.* (a) The fire detecting system shall be divided into separate zones to restrict the area covered by any particular alarm signal.

(b) All spaces in a fire detecting zone shall be accessible from one to another without leaving the deck involved. All doors in watertight subdivision bulkheads and main vertical zone bulkheads shall be assumed closed for the purpose of this requirement.

(c) The fire detecting zone shall not include spaces on more than one deck, except:

(1) Adjacent and communicating spaces on different decks in the ends of the vessel, having a combined deck area of not more than 3,000 feet.

(2) Isolated rooms or lockers in such spaces as mast houses, wheelhouse top, etc., which are easily communicable with the area of the fire-detecting circuit to which they are connected.

(d) The fire detecting zone shall not include more than 50 protected rooms or spaces.

(e) Individual tubing circuits shall not contain more than 1,000 feet of pneumatic tubing or its equivalent. However, more than one tubing circuit may be included in the same fire detecting zone.

§ 76.30–10 *Location and spacing of tubing.* (a) The tubing shall be located on the overhead or within 12 inches of the overhead on the bulkheads. Where liable to physical damage, the tubing shall be suitably protected.

(b) In each enclosed space or separate room there shall be exposed at least 5 percent of the total length of tubing in that circuit, but in no case shall the amount be less than 25 feet.

(c) No spot on the overhead of a protected space shall be more than 12 feet from the nearest point of tubing. Where beams or girders extend below the ceiling, or where the ceiling is installed at more than one level, the tubing shall be so located as to be most effective.

§ 76.30–15 *Operation and installation.* (a) The system shall be so arranged and installed that the presence of a fire in any of the protected spaces will automatically be registered visibly and audibly in the pilothouse or fire control station. The visible notice shall automatically indicate the zone in which the alarm originated. On vessels over 150 feet in length, there shall also be an audible alarm in the engine room.

(b) The tubing or detecting devices, pneumatic-electric converting units, detecting cabinets, and alarms shall be of an approved type.

(c) In general, the system shall be adjusted to operate at a temperature rise of approximately 40 degrees F. per minute at the center of the circuit.

(d) The fire detecting system shall be used for no other purpose except that it may be incorporated with the manual alarm system.

(e) All wiring and electrical circuits and equipment shall meet the applicable requirements of Subchapter J (Electrical Engineering) of this chapter.

(f) A framed chart or diagram shall be installed in the wheelhouse or control station adjacent to the detecting cabinet indicating the location of the various detecting zones and giving instructions for the operation, maintenance, and testing of the system. This chart, or a separate card or booklet to be kept near the chart, shall have tabulated spaces for the date and signature of the licensed officer of the vessel who shall witness or conduct the periodic tests.

(g) The audible alarms shall be identified as required by § 78.47–13 of this subchapter.

§ 76.30–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and equipment previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.30–5 through 76.30–15 insofar as is reasonable and practicable.

SUBPART 76.33—SMOKE DETECTING SYSTEM, DETAILS

§ 76.33–1 *Application.* (a) Where a smoke detecting system is installed, the provisions of this subpart, with the exception of § 76.33–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 76.33–90.

§ 76.33–5 *Zoning.* (a) The smoke detecting system shall be divided into separate zones to restrict the area covered by any particular alarm signal.

(b) The smoke detecting zone shall not include spaces on more than one deck, except the small adjacent spaces mentioned in paragraph (c) of this section.

(c) Each separate space shall be considered as a zone, except that two or three small adjacent spaces having a combined volume not exceeding 5,000 cubic feet may be connected on the same zone.

(d) Where a space is of such size that one accumulator is not sufficient, not more than two accumulators may be combined in one zone.

§ 76.33–10 *Location and spacing of accumulators.* (a) Smoke accumulators shall be located overhead in each compartment. Where liable to physical damage, the accumulators and piping shall be suitably protected.

(b) No spot on the overhead of a protected space shall be more than 40 feet from an accumulator.

(c) Accumulators shall not be located closer to the opening of a ventilator than three times the diameter or equivalent diameter of the opening.

§ 76.33–15 *Piping.* (a) Individual pipes shall be not less than ¾-inch standard pipe size.

(b) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(c) Where a smoke detecting system serves a space used alternately for liquid and dry cargo, a valve shall be installed

between the tank and the detecting cabinet so that the line may be shut off when liquids are carried. When the smoke detecting system is combined with a fire extinguishing system, the operation of the valve shall not affect the operation of the fire extinguishing system.

(d) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury. The piping shall be installed with as easy bends as practicable, and shall be installed to grade to low points for drainage.

(e) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

§ 76.33–20 *Operation and installation.* (a) The system shall be so arranged and installed that the presence of smoke in any of the protected spaces will automatically be indicated visually to an observer directly in front of the detecting cabinet. The visible notice shall automatically indicate the zone in which the alarm originated. The detecting cabinet shall normally be located in the pilothouse or fire control station. On vessels of over 5,000 gross tons there shall also be an automatic audible alarm in the wheelhouse together with an auxiliary audible alarm in the engine room.

(b) If the detecting cabinet is not located in the pilothouse or fire control station, it shall be located in convenient proximity to the valves of the extinguishing system. In this case, there shall be an automatic visual indication in the pilothouse or fire control station indicating the zone in which the alarm originated as well as an automatic audible alarm. There shall also be an auxiliary audible alarm in the engine room.

(c) A sufficient quantity of exhaust from the detecting cabinet shall discharge into the pilothouse or control station to permit the detection of fire by odor. A valve shall be installed in such space to direct the exhaust, if obnoxious, to the outside. If the detecting cabinet is not located in the pilothouse or control station, the residual exhaust shall be discharged in the vicinity of the cabinet.

(d) The smoke detecting system shall be used for no other purpose except that it may be incorporated with the fire extinguishing system to the spaces covered by the smoke detecting system.

(e) The accumulators, detecting cabinet, interconnecting valves with the fire extinguishing system, alarms, and indicating devices shall be of an approved type.

(f) All wiring and electrical circuits and equipment shall meet the applicable requirements of Subchapter J (Electrical Engineering) of this chapter.

(g) A framed chart or diagram shall be installed in the pilothouse or control station adjacent to the detecting cabinet or auxiliary panel indicating the location of the various zones and giving instructions for the operation, maintenance, and testing of the system. This chart, or a separate card or booklet to be kept near the chart, shall have tabulated spaces for the date and signature of the licensed officer of the vessel who shall witness or conduct the periodic tests.

(h) The audible smoke detecting alarms shall be identified as required by § 78.47–13 of this subchapter.

§ 76.33–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, material, and equipment previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.33–5 through 76.33–15 insofar as is reasonable and practicable.

SUBPART 76.35—MANUAL ALARM SYSTEM, DETAILS

§ 76.35–1 *Application.* (a) Where a manual alarm system is installed, the provisions of this subpart, with the exception of § 76.35–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contrated for prior to November 19, 1952, shall meet the requirements of § 76.35–90.

§ 76.35–5 *Zoning.* (a) The zoning of the manual alarm system shall meet the same requirements as for the electric fire detecting system, § 76.27–5.

§ 76.35–10 *Location and spacing of manual alarm boxes.* (a) There shall be at least one manual alarm box in each zone.

(b) Manual alarms shall be located in main passageways, stairway enclosures, public spaces, or similar locations where they will be readily available and easily seen in case of need.

(c) In general, a sufficient number of manual alarm boxes shall be employed that a person escaping from any space would find a manual alarm box convenient on his normal route of escape.

§ 76.35–15 *Operation and installation.* (a) The system shall be so arranged and installed that the presence of a fire may be reported from any of the protected spaces and be automatically registered visibly and audibly in the pilothouse or fire control station. The visible notice shall indicate the zone in which the alarm originated. There shall also be an audible alarm in the engine room.

(b) The manual alarm boxes, cabinet, and alarms shall be of an approved type.

(c) The manual alarm system shall be used for no other purpose, except that it may be incorporated with the fire detecting system.

(d) All wiring and electrical circuits and equipment shall meet the applicable requirements of Subchapter J (Electrical Engineering) of this chapter.

(e) A framed chart or diagram shall be installed in the wheelhouse or control station adjacent to the detecting cabinet indicating the location of the various detecting zones and giving instructions for the operation, maintenance, and testing of the system. This chart, or a separate booklet to be kept near the chart, shall have tabulated spaces for the date and signature of the licensed officer of the vessel who shall witness or conduct the periodic tests.

(f) The manual alarm boxes and bells shall be identified as required by § 78.47–10 of this subchapter.

§ 76.35–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and equipment previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph, and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 76.35–5 through 76.35–15 insofar as is reasonable and practicable.

SUBPART 76.50—HAND PORTABLE FIRE EXTINGUISHERS AND SEMIPORTABLE FIRE EXTINGUISHING SYSTEMS, ARRANGEMENTS, AND DETAILS

§ 76.50–1 *Application.* (a) The provisions of this subpart, with the exception of § 76.50–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 76.50–90.

§ 76.50–5 *Classification.* (a) Hand portable fire extinguishers and semiportable fire extinguishing systems shall be classified by a combination letter and number symbol, the letter indicating the type of fire which the unit could be expected to extinguish, and the number indicating the relative size of the unit.

(b) The types of fire will be designated as follows:

(1) "A" for fires in ordinary combustible materials where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance.

(2) "B" for fires in flammable liquids, greases, etc., where a blanketing effect is essential.

(3) "C" for fires in electrical equipment where the use of nonconducting extinguishing agent is of first importance.

(c) The number designations for size will start with "I" for the smallest to "V" for the largest. Sizes I and II are considered hand portable fire extinguishers and sizes III, IV and V are considered semi-portable fire extinguishing systems which shall be fitted with suitable hose and nozzle or other practicable means so that all portions of the space concerned may be covered. Examples of size graduations for some of the typical hand portable and semiportable fire extinguishing systems are set forth in Table 76.50–5 (c).

TABLE 76.50-5 (c)

Classification		Soda-acid and water, gallons	Foam, gallons	Carbon dioxide, pounds	Carbon tetrachloride, quarts	Dry chemical, pounds
Type	Size					
A	I	1¼	1¼			
A	II	2½	2½			
B	I		1¼	4	1	4
B	II		2½	15		12
B	III		12	35		(1)
B	IV		20	50		(1)
B	V		40	100		(1)
C	I			4	1	4
C	II			15		12

[1] Minimum values not established at this time.

(d) All hand portable fire extinguishers and semi-portable fire extinguishing systems shall have permanently attached thereto a metallic name plate giving the name of the item, the rated capacity in gallons, quarts, or pounds, the name and address of the person or firm for whom approved, and the identifying mark of the actual manufacturer.

§ 76.50-10 *Location.* (a) Approved hand portable fire extinguishers and semi-portable fire extinguishing systems shall be installed in accordance with Table 76.50-10 (a). The location of the equipment shall be to the satisfaction of the Officer in Charge, Marine Inspection. Nothing in this paragraph shall be construed as limiting the Officer in Charge, Marine Inspection, from requiring such additional equipment as he deems necessary for the proper protection of the vessel.

TABLE 76.50-10 (a)

Space	Hand portable fire extinguisher and semi-portable fire extinguishing systems	
	Classification (see 76.50-5)	Quantity and location
Safety area [1]		
Wheelhouse or fire control room	A-II, B-II, C-II.	1 of each classification on vessels over 1,000 gross tons. (Not required in both spaces.) (Multiple classification may be recognized.)
Stairway and elevator inclosures		None required.
Communicating corridors	A-II	1 in each main corridor in each main vertical zone. (May be located in stairway inclosures.)
Lifeboat embarkation and lowering stations		None required.
Radio room	C-I [2]	2 in vicinity of exit.[2]
Accommodations [1]		
Staterooms, toilet spaces, isolated pantries, etc.		None required.
Officers' lockers, and isolated storerooms		Do.
Public spaces	A-II	1 for each 2,500 square feet or fraction thereof located in vicinity of exits, except that none required for spaces under 500 square feet.
Open decks or enclosed promenades		None required.
Service spaces		
Galleys	B-II or C-II	1 for each 2,500 square feet or fraction thereof suitable for hazards involved.
Main pantries	A-II	1 for each 2,500 square feet or fraction thereof located in vicinity of exits.
Motion picture booths and film lockers	C-I [3]	1 outside in vicinity of exit.
Paint and lamp rooms	B-II	1 outside space in vicinity of exit.
Inaccessible baggage, mail, and specie rooms, and storerooms.		None required.
Accessible baggage, mail, and specie rooms, and storerooms.	A-II	1 for each 2,500 square feet or fraction thereof located in vicinity of exits, either inside or outside the spaces.
Refrigerated storerooms	A-II	1 for each 2,500 square feet or fraction thereof located in vicinity of exits, outside the spaces.
Carpenter, valet, photographic, printing shops, sales rooms, etc.	A-II	1 outside the space in vicinity of exit.
Machinery spaces		
Coal Fired Boilers: Bunker and boiler space		None required.
Oil Fired Boilers: Spaces containing oil fired boilers, either main or auxiliary, or their fuel oil units.	B-II	2 required.[3]
	B-V	1 required.[4]
Internal combustion on gas turbine propelling machinery spaces.	B-II	1 for each 1,000 B. H. P., but not less than 2 nor more than 6.
	B-III	1 required.[5]
Electric propulsive motors or generators of open type.	C-II	1 for each propulsion motor or generator unit.
Enclosed ventilating systems for motors and generators of electric propelling machinery.		None required.
Auxiliary spaces, internal combustion or gas turbine.	B-II	1 outside the space in vicinity of exit.[6]
Auxiliary spaces, electric emergency motors or generators.	C-II	Do.
Auxiliary spaces, steam		None required.
Trunks to machinery spaces		Do.
Fuel tanks	B-II	2 required in spaces containing tanks for fuels having a flash point of 110 degrees F. or less.
Cargo spaces		
Inaccessible during voyage, including trunks (excluding tanks).		None required.
Accessible during voyage	A-II	1 for each 1,200 square feet or fraction thereof.
Vehicular spaces (covered by sprinkler system)	B-II	1, plus 1 for each 6,000 square feet or fraction thereof.[7]
Vehicular spaces (not covered by sprinkler system).	B-II	1, plus 1 for each 1,500 square feet or fraction thereof.[7]
Cargo oil tanks		None required.

[1] In any case, on vessels of 150 feet in length and over, there shall be at least 2 A-II units on each passenger deck.
[2] For vessels on an International Voyage, substitute 1 C-II in vicinity of exit.
[3] Vessels of less than 1,000 gross tons and not on an International Voyage, require 1.
[4] Vessels of 1,000 gross tons and under and not on an International Voyage, may substitute 1 B-IV.
[5] If oil burning donkey boiler fitted in space, the B-V previously required for the protection of the boiler room may be substituted.
[6] 2 B-I units may be substituted for 1 B-II unit.
[7] Not required on vessels under 300 gross tons if fuel has flash point higher than 110 degrees F.

(b) Semiportable fire extinguishing systems shall be located in the open so as to be readily seen.

(c) If hand portable fire extinguishers are not located in the open or behind glass so that they may be readily seen, they may be placed in enclosures together with the fire hose, provided such enclosures are marked as required by § 78.47-20 of this subchapter.

(d) Hand portable fire extinguishers and their stations shall be numbered in accordance with § 78.47-30 of this subchapter.

(e) Hand portable fire extinguishers in which the medium is stored under pressure shall not be kept in passenger or crew accommodations. However, where specifically required, they may be located in passageways adjacent to entrances of rooms containing hazards.

§ 76.50-15 *Spare charges.* (a) Spare charges shall be carried for at least 50 percent of each type of hand portable fire extinguisher required by § 76.50-10 (a). However, if the unit is of such type that it cannot be readily recharged by the vessel's personnel, one spare unit of the same classification shall be carried in lieu of spare charges for all such units of the same type.

(b) Spare charges shall be so packaged as to minimize the hazards to personnel while recharging the units. Acid shall be contained in a Crown stopper type of bottle.

(c) Extra safety valve units shall be carried on board for at least 50 percent of all foam type hand portable fire extinguishers and semi-portable fire extinguishing systems.

§ 76.50-90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) The provisions of §§ 76.50-5 through 76.50-15 shall be met with the exception that existing installations in safety areas, accommodations, service spaces, and cargo spaces may be maintained if in the opinion of the Officer in Charge, Marine Inspection, they are in general agreement with the standard of safety prescribed by Table 76.50-10 (a). In such cases, minor modifications may be made to the same standards as the original installation, provided that in no case will a greater departure from the standards of Table 76.50-10 (a) be permitted than presently exists.

SUBPART 76.60—FIRE AXES

§ 76.60-1 *Application.* (a) The provisions of this subpart shall apply to all vessels.

§ 76.60-5 *Number required.* (a) All vessels except barges shall carry at least the minimum number of fire axes as set forth in Table 76.60-5 (a). Nothing in this paragraph shall be construed as limiting the Officer in Charge, Marine Inspection, from requiring such additional fire axes as he deems necessary for the proper protection of the vessel.

TABLE 76.60-5 (a)

Gross tons		Number of axes
Over	Not over	
---	50	1
50	200	2
200	500	4
500	1,000	6
1,000	---	8

(b) Covered barges shall carry at least three fire axes and uncovered barges shall carry at least two fire axes.

§ 76.60-10 *Location.* (a) Fire axes shall be distributed throughout the spaces available to passengers and crew so as to be most readily available in the event of emergency.

(b) If fire axes are not located in the open or behind glass so that they may be readily seen, they may be placed in enclosures together with the fire hose, provided such enclosures are marked as required by § 78.47-20 of this subchapter.

PART 77—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

Part 77 is amended to read as follows:

SUBPART 77.01—APPLICATION

Sec.
77.01-1 General.

SUBPART 77.03—MARINE ENGINEERING SYSTEMS

77.03-1 Installation and details.

SUBPART 77.05—ELECTRICAL ENGINEERING AND INTERIOR COMMUNICATION SYSTEMS

77.05-1 Installation and details.

SUBPART 77.07—ANCHORS, CHAINS, AND HAWSERS

77.07-1 Application.
77.07-5 Ocean, Coastwise, or Great Lakes Service.
77.07-10 Lakes, bays, and sounds, or river service.
77.07-90 Vessels contracted for prior to November 19, 1952.

SUBPART 77.13—RADIOTELEGRAPH

77.13-1 Required by Federal Communications Commission.

SUBPART 77.15—RADIO DIRECTION FINDER

77.15-1 Application.
77.15-5 Required by Federal Communications Commission.
77.15-90 Vessels contracted for prior to November 19, 1952.

SUBPART 77.17—NAVIGATION LIGHTS AND SHAPES

77.17-1 Vessels other than motorboats.
77.17-5 Motorboats operating on the high seas.
77.17-10 Motorboats operating on the navigable waters of the United States.

SUBPART 77.20—WHISTLES

77.20-1 Vessels other than sailing vessels, barges, and motorboats.
77.20-5 Motorboats operating on the high seas.
77.20-10 Motorboats operating on the navigable waters of the United States.

SUBPART 77.23—FOG HORNS

77.23-1 Vessels other than motorboats.
77.23-5 Motorboats.

SUBPART 77.25—FOG BELLS

77.25-1 Vessels other than motorboats.
77.25-5 Motorboats operating on the high seas.

Sec.
77.25-10 Motorboats operating on the navigable waters of the United States.

SUBPART 77.27—SOUNDING EQUIPMENT

77.27-1 When required.

SUBPART 77.30—EMERGENCY EQUIPMENT

77.30-1 Application.
77.30-5 General.
77.30-10 Stowage.
77.30-15 Spare charges.
77.30-90 Vessels contracted for prior to November 19, 1952.

AUTHORITY: §§ 77.01-1 to 77.30-90 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, as amended, secs. 1, 2, 49 Stat. 1544, secs. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 5, 55 Stat. 244, 245; 46 U. S. C. 391, 392, 404, 367, 526p, 1333, 50 U. S. C. App. 1275.

SUBPART 77.01—APPLICATION

§ 77.01-1 *General.* (a) The provisions of this part shall apply to all vessels except as specifically noted.

SUBPART 77.03—MARINE ENGINEERING SYSTEMS

§ 77.03-1 *Installation and details.* (a) The installation of all systems of a marine engineering nature, together with the details of design, construction, and installation, shall be in accordance with the requirements of Subchapter F (Marine Engineering) of this chapter. Systems of this type include the following:

Steering systems.
Power for going astern.
Bilge and ballast systems.
Tank vent and sounding systems.
Overboard discharges and shell connections.
Pipe and pressure systems.

SUBPART 77.05—ELECTRICAL ENGINEERING AND INTERIOR COMMUNICATION SYSTEMS

§ 77.05-1 *Installation and details.* (a) The installation of all systems of an electrical engineering or interior communications nature, together with the details of design, construction, and installation, shall be in accordance with the requirements of Subchapter J (Electrical Engineering) of this chapter. Systems of this type include the following:

Ship's service lighting and power systems.
Emergency lighting and power systems.
General alarm systems.
Sound powered telephone and voice tube communication systems.
Engine order telegraph systems.
Rudder angle indicator systems.
Emergency loudspeaker systems.
Refrigerated spaces alarm systems.
Miscellaneous machine alarms and controls.
Daylight signaling lamps.

SUBPART 77.07—ANCHORS, CHAINS, AND HAWSERS

§ 77.07-1 *Application.* (a) The provisions of this subpart, with the exception of § 77.07-90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 77.07-90.

§ 77.07-5 *Ocean, coastwise, or Great Lakes service.* (a) Vessels in ocean, coastwise, or Great Lakes service shall be fitted with anchors, chains, and hawsers in general agreement with the standards established by the American Bureau of Shipping, see Subpart 70.35 of this subchapter.

§ 77.07-10 *Lakes, bays, and sounds, or river service.* (a) Vessels in lakes, bays, and sounds, or river service shall be fitted with such ground tackle and hawsers as deemed necessary by the Officer in Charge, Marine Inspecion, depending upon the size of the vessel and the waters on which it operates.

§ 77.07-90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Installations previously accepted or approved shall be considered satisfactory for the same service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. If the service of the vessel is changed, the suitability of the equipment will be established by the Officer in Charge, Marine Inspection.

SUBPART 77.13—RADIOTELEGRAPH

§ 77.13-1 *Required by Federal Communications Commission.* (a) Radiotelegraph installations are required on certain vessels. Details of the application of this requirement as well as details of the installation shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission.

SUBPART 77.15—RADIO DIRECTION FINDER

§ 77.15-1 *Application.* (a) The provisions of this subpart, with the exception of § 77.15-90, shall apply to all mechanically propelled vessels of 1,600 gross tons and over in ocean service or on an international voyage contracted for on or after November 19, 1952. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of § 77.15-90.

§ 77.15-5 *Required by Federal Communications Commission.* (a) All vessels shall be fitted with a radio direction finder. Details of the installation shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission.

§ 77.15-90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Vessels of over 5,000 gross tons shall meet the requirements of § 77.15-5.

(2) Vessels of from 1,600 gross tons through 5,000 gross tons shall meet the requirements of § 77.15-5 on or before November 19, 1954.

SUBPART 77.17—NAVIGATION LIGHTS AND SHAPES

§ 77.17-1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be equipped with navigation lights and shapes as prescribed by the pilot rules applicable to the waters on which the vessel is navigated.

§ 77.17-5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the naviga-

ble waters of the United States shall meet the requirements for navigation lights and shapes prescribed by § 77.17–1 for vessels other than motorboats.

§ 77.17–10 *Motorboats operating on the navigable waters of the United States.* (a) Every motorboat operating on the navigable waters of the United States shall, in all weathers from sunset to sunrise, carry and exhibit lights when under way as prescribed by this section, and during such time no other lights which may be mistaken for those prescribed shall be exhibited. No penalty is incurred by motorboats for a failure to carry lights between the hours of sunrise and sunset.

(b) Every motorboat of Classes A and 1 shall carry the following lights:

(1) A bright light aft to show all around the horizon.

(2) A combined lantern in the fore part of the vessel and lower than the white light aft, showing green to starboard and red to port, so fixed as to throw the light from right ahead to 2 points abaft the beam on their respective sides.

(c) Every motorboat of Classes 2 and 3 shall carry the following lights:

(1) A bright white light in the fore part of the vessel as near the stem as practicable so constructed as to show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light 10 points on each side of the vessel; namely, from right ahead to 2 points abaft the beam on either side.

(2) A bright white light aft to show all around the horizon and higher than the white light forward.

(3) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side. The said lights shall be fitted with inboard screens of sufficient length and height or shall be mounted on cabin sides and so set as to prevent these lights from being seen across the bow.

(d) All motorboats propelled by sail and machinery or by sail alone shall carry and exhibit the following lights:

(1) Motorboats of Classes A and 1 when propelled by sail and machinery or by sail alone shall carry the white light prescribed by paragraph (b) (1) of this section, but not the lantern prescribed by paragraph (b) (2) of this section.

(2) Motorboats of Classes 2 and 3 when propelled by sail and machinery or by sail alone shall carry the colored lights prescribed by paragraph (c) (3) of this section, but not the white lights prescribed by paragraphs (c) (1) and (2) of this section.

(3) In addition, motorboats of all classes when so propelled shall carry ready at hand a lantern or flashlight showing a white light which shall be exhibited in sufficient time to avert collision.

(e) Every white light prescribed by this section shall be of a character as to be visible at a distance of at least 2 miles. Every colored light prescribed by this section shall be of such character as to be visible at a distance of at least 1 mile. The word "visible" when applied to lights shall mean visible on a dark night with clear atmosphere.

(f) The lights described in paragraphs (b) through (e) of this section are required by the Motorboat Act, 46 U. S. C. 526b. Other navigation lights and shapes required by the Pilot Rules applicable to the waters on which the motorboat is operated, such as anchor lights, amber whistle light, etc., which are not in conflict with the lights required by the Motorboat Act, shall also be carried.[1]

SUBPART 77.20—WHISTLES

§ 77.20–1 *Vessels other than sailing vessels, barges, and motorboats.* (a) All vessels other than sailing vessels, barges, and motorboats, shall be equipped with an efficient whistle or similar appliance to give the necessary whistle signals required by the pilot rules applicable to the waters on which the vessel is navigated. The location of the whistle and operating devices shall be as follows:

(1) Means shall be provided to operate the whistle or other appliance by mechanical means from a position adjacent to the main steering station and from the steering station on top of the wheelhouse where such steering station is fitted. Details of the whistle operating device shall be as described in Subchapter J (Electrical Engineering) of this chapter.

(2) In general, the whistle shall be located on the forward side of or above the structure of the vessel so as to be as free of obstructions as possible. Where practicable, it shall be installed at least 6 feet above the wheelhouse, except that on vessels navigating the Western Rivers, and any vessel of less than 100 gross tons, it shall be at least 2 feet above the wheelhouse.

(3) On double ended ferry vessels and similar vessels, where steam whistles are employed, they shall be installed both forward and aft of the stacks or one such whistle on either the port or starboard side of the stack.

§ 77.20–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for whistles or similar appliances prescribed by § 77.20–1 for vessels other than motorboats.

§ 77.20–10 *Motorboats operating on the navigable waters of the United States.* (a) Motorboats operating on the navigable waters of the United States shall be provided with an efficient whistle, or other sound producing mechanical device as set forth in Table 77.20–10 (a).

TABLE 77.20–10 (a)

Class of motorboat	Type of device
A	None.
1	Mouth, hand, or power operated, capable of producing a blast of 2 seconds or more duration, and audible for at least ½ mile.
2	Hand or power operated, capable of producing a blast of 2 seconds or more duration, and audible for a distance of at least 1 mile.
3	Power operated, capable of producing a blast of 2 seconds or more duration, and audible for a distance of at least 1 mile.

SUBPART 77.23—FOG HORNS

§ 77.23–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be equipped with an efficient fog horn as prescribed by the pilot rules applicable to the waters on which the vessel is navigated. On vessels in ocean or coastwise service, the fog horn shall be sounded by mechanical means.

§ 77.23–5 *Motorboats.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for fog horns prescribed by § 77.23–1 for vessels other than motorboats.

SUBPART 77.25—FOG BELLS

§ 77.25–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be provided with an efficient fog bell at least 8 inches in diameter. The fog bell shall be located where the sound will be least obstructed.

§ 77.25–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for fog bells prescribed by § 77.25–1 for vessels other than motorboats.

§ 77.25–10 *Motorboats operating on the navigable waters of the United States.* (a) When operating on the navigable waters of the United States, motorboats of Classes A and 1 are not required to carry fog bells. However, motorboats of Classes 2 and 3 operating on the navigable waters of the United

[1] Running lights. The lights provided for in section 3 of the act of April 25, 1940 (54 Stat. 164, U. S. C. 526b), are running lights for motorboats subject to the provisions of that act in lieu of the lights prescribed, respectively, by Article 2 of the act approved June 7, 1897 (30 Stat. 96, 33 U. S. C. 172) (covering certain harbors, rivers, and inland waters of the United States); Rule 3 of the act approved February 8, 1895, as amended (28 Stat. 645, as amended, 33 U. S. C. 252) (covering the Great Lakes and their connecting and tributary waters); and Rules 3, 5, 6, and 7 of R. S. 4233, as amended (28 Stat. 672, 33 U. S. C. 312, 314–316) (covering western rivers and the Red River of the North). These running lights are required to be carried on all motorboats when under way on navigable waters of the United States, in all weathers, from sunset to sunrise, but not on the high seas. Motorboats, when on the high seas, shall exhibit the lights prescribed by the International Rules of 1890, as amended (26 Stat. 321–325, as amended, 33 U. S. C. 71–82). The provisions of section 3 of the act of April 25, 1940 (54 Stat. 164, 46 U. S. C. 526b), requiring running lights on motorboats are not in conflict with the provisions of the acts previously cited requiring anchor lights and other lights in addition to the running lights on pilot, towing, and fishing vessels. It will be observed that the penalties for violations of existing laws not in conflict with the act of April 25, 1940 (54 Stat. 163–167, 46 U. S. C. 526–526t), remain unchanged.

States shall be provided with an efficient fog bell.

SUBPART 77.27—SOUNDING EQUIPMENT

§ 77.27–1 *When required.* (a) All mechanically propelled vessels in ocean or coastwise service of 500 gross tons and over, and all mechanically propelled vessels in Great Lakes service of 1,500 gross tons and over except paddle wheel vessels, shall be fitted with an efficient mechanical deep-sea sounding apparatus in addition to the deep-sea hand leads. On Great Lakes vessels, a shallow water alarm may be substituted.

SUBPART 77.30—EMERGENCY EQUIPMENT

§ 77.30–1 *Application.* (a) The provisions of this subpart, with the exception of § 77.30–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 77.30–90.

§ 77.30–5 *General.* (a) All self-contained breathing apparatus and gas masks shall be of an approved type, constructed in accordance with Subpart 160.011 of Subchapter Q (Specifications) of this chapter.

(b) All gas masks, except the special refrigeration gas masks, shall be of the type approved by the Bureau of Mines as "Type N, Universal Gas Mask".

(c) All flame safety lamps shall be of an approved type, constructed in accordance with Subpart 160.016 of Subchapter Q (Specifications) of this chapter.

(d) All emergency equipment shall be maintained in an operative condition, and it shall be the responsibility of the master and chief engineer to ascertain that a sufficient number of the crew are familiar with the operation of the equipment.

§ 77.30–10 *Stowage.* (a) The equipment set forth in Table 77.30–10 (a), together with such other items as the master may deem necessary, shall be stowed in convenient, accessible locations for use in case of emergency.

(b) The refrigeration gas masks shall be stowed convenient to, but outside of the spaces containing the refrigeration equipment.

(c) Half of the remaining equipment set forth in Table 77.30–10 (a) shall be stowed in or near the pilothouse together with a fire axe and the hand portable fire extinguishers required by Table 76.50–10 (a) for that location. The other half of the equipment shall be stowed in a convenient accessible location, remote from the pilothouse, and preferably adjacent to the main entrance to the machinery space. Where only one of an item is required, it shall be stowed in the pilothouse.

TABLE 77.30–10 (a)

Service	Number of passenger staterooms	Self-contained breathing apparatus	Additional gas masks or self-contained breathing apparatus	Special refrigeration gas masks [1]	Flame safety lamps	Portable electric drill
International voyage	0 to 49	2		1	2	1
	50 to 100	2	2	1	2	1
	over 100	2	4	1	2	1
Ocean and coastwise, not on an international voyage.	0 to 49			1		
	50 to 100	1	3	1		
	over 100	1	5	1	1	
Great Lakes, and lakes, bays, and sounds.	0 to 49			1		
	50 to 100	1	1	1		
	over 100	1	3	1	1	
Rivers	0 to 49			1		
	50 to 100	1		1		
	over 100	1	1	1	1	

[1] Required only on vessels equipped with refrigeration, small unit type refrigerators of not more than 20 cubic feet capacity excluded. A gas mask suitable for protection against each refrigerant used shall be provided.

§ 77.30–15 *Spare charges.* (a) A complete recharge shall be carried for each gas mask and self-contained breathing apparatus. The spare charge shall be stowed in the same location as the equipment it is to reactivate.

§ 77.30–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) The requirements of §§ 77.30–5 through 77.30–15 shall be complied with insofar as the number of items of equipment and the method of stowage of the equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications set forth in § 77.30–5, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection, but all new installations or replacements shall meet the applicable specifications or requirements.

PART 78—OPERATIONS

Part 78 is amended to read as follows:

SUBPART 78.01—APPLICATION

Sec.
78.01–1 General.

SUBPART 78.03—PENALTIES

78.03–1 General.

SUBPART 78.05—NOTICE TO MARINERS AND AIDS TO NAVIGATION

78.05–1 Duty of officers.
78.05–5 Charts.

SUBPART 78.07—NOTICE OF CASUALTY AND VOYAGE RECORDS

78.07–1 Notice of casualty.
78.07–5 Information required.
78.07–10 Written report.
78.07–15 Retention of records.
78.07–20 Aids to navigation.
78.07–25 Reports when state of war exists.

SUBPART 78.10—PERSONS ALLOWED IN PILOTHOUSE AND ON NAVIGATION BRIDGE

78.10–1 Persons excluded.
78.10–5 Posting.

SUBPART 78.13—STATION BILLS

Sec.
78.13–1 Master's responsibility.
78.13–5 Duties of crew.
78.13–10 Emergency signals.
78.13–15 Emergency squad.
78.13–20 Manning of lifeboats and life rafts.
78.13–25 Master to instruct crew.

SUBPART 78.15—DOORS CLOSED AT SEA

78.15–1 Subdivision bulkheads.

SUBPART 78.17—TESTS, DRILLS, AND INSPECTIONS

78.17–1 Watertight doors.
78.17–5 Valves and closing appliances.
78.17–10 Loudspeaker system.
78.17–15 Steering gear, whistle, and means of communication.
78.17–20 Drafts and load line markings.
78.17–25 Sanitation.
78.17–30 Examination of boilers and machinery.
78.17–35 Hatches and other openings.
78.17–40 Line-throwing appliances.
78.17–45 Emergency lighting and power systems.
78.17–50 Fire and boat drills.
78.17–55 Electric power operated lifeboat winches.
78.17–60 Lifeboats, life rafts, life floats, and buoyant apparatus.
78.17–65 Smoke detecting system.

SUBPART 78.20—STEERING ORDERS

78.20–1 Method of communicating.

SUBPART 78.23—WHISTLING

78.23–1 Unnecessary whistling prohibited.

SUBPART 78.25—UNAUTHORIZED LIGHTS

78.25–1 Unauthorized lights prohibited.

SUBPART 78.27—SEARCHLIGHTS, PROPER USE OF

78.27–1 Improper use prohibited.

SUBPART 78.30—LOOKOUTS, PILOTHOUSE WATCH, PATROLMEN, AND WATCHMEN

78.30–1 Lookouts required.
78.30–5 Pilothouse watch.
78.30–10 Supervised patrol.
78.30–15 Watchmen.
78.30–20 Master's and officer's responsibility.

SUBPART 78.33—REPORTS OF ACCIDENTS, REPAIRS, AND UNSAFE EQUIPMENT

78.33–1 Repairs of boiler and pressure vessels.
78.33–5 Accidents to machinery.
78.33–10 Notice required before repairs.
78.33–15 Fusible plugs.

SUBPART 78.35—CABLE TRAVELER

78.35–1 When required.

SUBPART 78.37—LOG BOOK ENTRIES

78.37–1 Log books and records.
78.37–5 Actions required to be logged.
78.37–10 Official log entries.

SUBPART 78.40—VEHICULAR FERRIES

78.40–1 Stowage of vehicles.
78.40–5 Securing of vehicles.
78.40–10 No smoking permitted.

SUBPART 78.43—RAILROAD PASSENGER CAR FERRIES

78.43–1 Precautions for railway passenger cars.

SUBPART 78.45—DISPLAY OF PLANS

78.45–1 When required.

SUBPART 78.47—MARKINGS FOR FIRE AND EMERGENCY EQUIPMENT, ETC.

78.47–1 Application.
78.47–3 General.
78.47–5 General alarm bell switch.

Sec.
78.47–7 General alarm bells.
78.47–9 Carbon dioxide alarm.
78.47–10 Manual alarm boxes.
78.47–13 Fire detecting and manual alarm, automatic sprinkler, and smoke detecting alarm bells.
78.47–15 Fire extinguishing system branch lines.
78.47–17 Fire extinguishing system controls.
78.47–20 Fire hose stations.
78.47–23 Supervised patrol stations.
78.47–25 Emergency squad equipment.
78.47–27 Self-contained breathing apparatus and gas masks.
78.47–30 Hand portable fire extinguishers.
78.47–33 Emergency lights.
78.47–35 Fire doors.
78.47–37 Watertight doors.
78.47–40 Exit signs.
78.47–43 Embarkation direction signs to lifeboats.
78.47–45 Lifeboat stations.
78.47–47 Stateroom notices.
78.47–50 Children's life preservers.
78.47–53 Automatic ventilation dampers.
78.47–55 Instructions for changing steering gear.
78.47–57 Rudder orders.
78.47–60 Lifeboats.
78.47–63 Life rafts, life floats, and buoyant apparatus.
78.47–65 Life preservers, wood floats, and ring life buoys.
78.47–67 Fire hose and axes.
78.47–70 Portable magazine chests.
78.47–90 Vessels contracted for prior to November 19, 1952.

SUBPART 78.50—MARKINGS ON VESSELS

78.50–1 Application.
78.50–5 Markings required by customs regulations.
78.50–10 Draft marks.
78.50–15 Load line marks.

SUBPART 78.53—PLACARD OF BREECHES BUOY INSTRUCTIONS

78.53–1 Application.
78.53–5 Where posted.

SUBPART 78.55—CARRYING OF EXCESS STEAM

78.55–1 Master and chief engineer responsible.

SUBPART 78.57—ROUTING INSTRUCTIONS

78.57–1 All personnel must comply.

SUBPART 78.60—COMPLIANCE WITH PROVISIONS OF CERTIFICATE OF INSPECTION

78.60–1 Master or person in charge responsible.

SUBPART 78.65—EXHIBITION OF LICENSE

78.65–1 Licensed officers.
78.65–5 Motorboat operators.

AUTHORITY: §§ 78.01–1 to 78.65–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4453, as amended, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 435, 367, 526p, 1333, 50 U. S. C. App. 1275.

SUBPART 78.01—APPLICATION

§ 78.01–1 *General.* (a) The provisions of this part shall apply to all vessels except as specifically noted.

SUBPART 78.03—PENALTIES

§ 78.03–1 *General.* (a) The marine safety and criminal statutes provide penalties for the violation of the applicable provisions of this subchapter, which penalties, depending upon the gravity of the violation, are as follows:

(1) Assessment and collections of civil monetary penalty.

(2) Criminal prosecution where no loss of life results.

(3) Criminal prosecution for manslaughter where loss of life results from violation of statute or regulation or from misconduct, negligence, or inattention to duty.

(4) Libel against vessel.

(b) In addition to the foregoing, any licensed or certificated personnel committing an act of misbehavior, negligence, unskillfulness, endangering life, violation of marine safety statutes or regulations or requirements thereunder, and incompetency shall be subject to proceedings under the provisions of 46 U. S. C. 239 and regulations thereunder (46 CFR Part 137) with respect to suspension or revocation of license or certificate.

SUBPART 78.05—NOTICE TO MARINERS AND AIDS TO NAVIGATION

§ 78.05–1 *Duty of officers.* (a) Licensed deck officers are required to acquaint themselves with the latest information published by the Coast Guard and the United States Navy regarding aids to navigation. Neglect to do so is evidence of neglect of duty. It is desirable that vessels shall have available in the pilothouse for convenient reference at all times a file of the applicable Notice to Mariners.

(1) Notice to Mariners, published weekly by the Coast Guard, contains announcements and information regarding aids to navigation and charts of waters of the United States and is available for free distribution at field offices of the Coast Guard, United States Coast and Geodetic Survey field stations, and the Marine Division, Customhouse.

(2) Notice to Mariners, published weekly by the United States Navy for the correction of charts, sailing directions, light lists, and other publications, and which includes foreign waters and certain waters of the United States, is available for free distribution at the Hydrographic Office, Branch Hydrographic offices, or any of the agencies of seaboard ports, and is also on file in the United States consulates where they may be inspected.

§ 78.05–5 *Charts.* (a) All vessels shall have charts of the waters on which they operate available for convenient reference at all times.

SUBPART 78.07—NOTICE OF CASUALTY AND VOYAGE RECORDS

§ 78.07–1 *Notice of casualty.* (a) The owner, agent, master, or person in charge of a vessel involved in a marine casualty shall give notice as soon as possible to the nearest marine inspection office of the U. S. Coast Guard whenever the casualty results in any of the following:

(1) Damage to property in excess of $1,500.

(2) Material damage affecting the seaworthiness or efficiency of a vessel.

(3) Stranding or grounding.

(4) Loss of life.

(5) Injury causing any persons to remain incapacitated for a period in excess of 72 hours; except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

§ 78.07–5 *Information required.* (a) The notice required by § 78.07–1 shall show the name and official number of the vessel involved, the owner or agent thereof, the nature and probable cause of the casualty, the locality in which it occurred, the nature and extent of injury to persons and the damage to property.

§ 78.07–10 *Written report.* (a) In addition to the notice required by § 78.07–1, the person in charge of the vessel shall, as soon as possible, report in writing and in person to the Officer in Charge, Marine Inspection, at the port in which the casualty occurred or nearest the port of first arrival. However, if from a distance it may be inconvenient to report in person, it may be done in writing only. The written report required herein for personal accident not involving death shall be made on Form CG–924E and for all other marine casualties or accidents the written report shall be made on Form CG–2692. If filed without delay these forms may also provide the notice required by § 78.07–1.

§ 78.07–15 *Retention of records.* (a) The owner, agent, master, or other person in charge of any vessel involved in a marine casualty shall retain such voyage records of the vessel as are maintained by the vessel, such as both rough and smooth deck and engine room logs, bell books, navigation charts, navigation work books, compass deviation cards, gyrocompass records, stowage plans, record of draft, aids to mariners, radiograms sent and received, the radio log and crew and passenger lists. The owner, agent, master, or other officer in charge, shall make these records available to a duly authorized Coast Guard officer or employee for examination upon request.

§ 78.07–20 *Aids to navigation.* (a) Whenever a vessel collides with a lightship, buoy, or other aid to navigation under the jurisdiction of the Coast Guard, or is connected with any such collision, it shall be the duty of the person in charge of such vessel to report the accident to the nearest Officer in Charge, Marine Inspection. No report on Form CG–2692 is required unless any of the results listed in § 78.07–1 (a) through (e) occur.

§ 78.07–25 *Reports when state of war exists.* (a) During the period when a state of war exists between the United States and any foreign nation, communications in regard to casualties or accidents shall be handled with caution and the reports shall not be made by radio or by telegram.

SUBPART 78.10—PERSONS ALLOWED IN PILOTHOUSE AND ON NAVIGATION BRIDGE

§ 78.10–1 *Persons excluded.* (a) Masters and pilots shall exclude from the pilothouse and navigator's bridge while under way, all persons not connected with the navigation of the vessel. However, inspectors of the Coast Guard, licensed officers of vessels, persons regularly engaged in learning the profession of pilot, officers of the Coast Guard, United States Navy, United States Coast

and Geodetic Survey, and the Engineer Department of the United States Army or Maritime Administration personnel, may be allowed in the pilothouse or upon the navigator's bridge upon the responsibility of the officer in charge.

§ 78.10–5 *Posting.* (a) The master of every vessel shall keep three printed copies of § 78.10–1, Form CG 802, posted in conspicuous places on such vessel, one of which shall be kept posted in the pilothouse.

(b) Such printed copies may be obtained from the Officer in Charge, Marine Inspection.

SUBPART 78.13—STATION BILLS

§ 78.13–1 *Master's responsibility.* (a) A station bill (muster list) shall be prepared by the master of the vessel who shall be responsible to sign such station bill and to ascertain that it is duly posted in conspicuous locations in the vessel, particularly in the crew quarters, before the vessel sails.

§ 78.13–5 *Duties of crew.* (a) The station bill shall set forth the special duties and duty station of each member of the crew for the various emergencies. The duties shall, as far as possible, be comparable with the regular work of the individual. The duties shall in general include the following and, in addition, such other duties shall be assigned as are necessary in the case of the particular vessel for the proper handling of the particular emergency:

(1) The closing of airports, watertight doors, fire doors, scuppers, sanitary and other discharges which lead through the vessel's hull below the margin line, etc., the stopping of fans and ventilating systems, and the operation of all safety equipment.

(2) The preparation and launching of liefboats, life rafts, and buoyant apparatus.

(3) The extinction of fire.

(4) The muster of passengers which shall in general be assigned to the stewards department, and shall include the following:

(i) Warning the passengers.

(ii) Seeing that they are dressed and have put on their life jackets in a proper manner.

(iii) Assembling the passengers and directing them to the appointed stations.

(iv) Keeping order in the passageways and stairways and generally controlling the movement of the passengers.

(v) Seeing that a supply of blankets is taken to the lifeboats.

(5) The custody of the portable radio apparatus required by Subpart 75.55 of this subchapter.

§ 78.13–10 *Emergency signals*—(a) *Station bill.* (1) The station bill shall set forth the various signals to be used for the calling of the crew to their stations and for giving instructions while at their stations. These signals shall be as set forth in this section.

(b) *Fire alarm stations.* (1) The fire alarm signal shall be a continuous rapid ringing of the ship's bell for a period not less than 10 seconds supplemented by the continuous ringing of the general alarm bells for not less than 10 seconds.

(2) For dismissal from fire alarm stations, the general alarm shall be sounded three times supplemented by three short blasts of the whistle.

(c) *Boat stations.* (1) The signal for boat stations or boat drill shall be a succession of more than six short blasts followed by one long blast of the whistle supplemented by a comparable signal on the general alarm bells.

(2) Where whistle signals are used for handling the lifeboats, they shall be as follows:

(i) To lower lifeboats, one short blast.

(ii) To stop lowering the lifeboats, two short blasts.

(3) For dismissal from boat stations, there shall be three short blasts of the whistle.

(d) *River vessels.* (1) In the case of river vessels, the ship's bell may be used in lieu of the whistle signals stipulated in this section.

(e) *Other emergency signals.* (1) The master of any vessel may establish such other emergency signals, in addition to the above, as will provide that all officers, crew, and passengers will have positive and certain notice of the existing emergency.

§ 78.13–15 *Emergency squad.* (a) Where the size of the crew permits, the station bill shall include an emergency squad which shall be organized by the master to form the nucleus of the damage control party. This squad should be specially trained in the use of all emergency and rescue equipment and should be made generally familiar with the vessel and fundamentals of damage control.

(b) The nature of the signals or other means for assembling the emergency squad shall be left to the discretion of the master, but such signals shall not conflict with navigational or general alarm signals.

§ 78.13–20 *Manning of lifeboats and life rafts.* (a) There shall be for each lifeboat a number of certificated lifeboatmen equal to that specified in Table 78.13–20 (a).

TABLE 78.13–20 (a)

Prescribed complement of lifeboat		Minimum number of lifeboatmen	
Over	Not over	Ocean service	All services other than ocean [1]
--------	25	2	1
25	40	2	2
40	60	3	3
60	85	4	4
85	110	5	5
110	--------	6	6

[1] Certificated lifeboatmen not required in river service.

(b) The allocation of the certificated lifeboatmen to each lifeboat shall be at the discretion of the master according to the circumstances.

(c) The master shall appoint a first and second in command for each lifeboat and life raft. On all services other than rivers, these persons shall be either licensed deck officers or certificated lifeboatmen, except for life rafts approved for 15 persons or less on vessels in Great Lakes, or lakes, bays, and sounds service. The person in charge of the lifeboat or life raft shall have a list of its crew, and shall see that the persons under his orders are acquainted with their several duties.

(d) The master shall assign to each motor-propelled lifeboat a man capable of working the motor.

(e) The master shall assign to each lifeboat carrying a wireless and searchlight a man capable of operating such equipment.

§ 78.13–25 *Master to instruct crew.* (a) The master shall conduct such drills and give such instructions as are necessary to insure that all hands are familiar with their duties as specified in the station bill.

SUBPART 78.15—DOORS CLOSED AT SEA

§ 78.15–1 *Subdivision bulkheads.* (a) All watertight doors in subdivision bulkheads shall be kept closed during navigation except when necessarily opened for working of the vessel, and in such cases they shall always be ready to be immediately closed.

SUBPART 78.17—TESTS, DRILLS, AND INSPECTIONS

§ 78.17–1 *Watertight doors.* (a) It shall be the duty of the master to see that all watertight doors in subdivision bulkheads that may be opened at sea, and all mechanisms, remote controls, and indicators connected therewith, shall be periodically inspected at least once in each week that the vessel is navigated to be assured that they are in proper operating condition. On vessels in which the voyage exceeds one week in duration, these doors shall be operated before the vessel leaves port. All such doors shall be operated daily.

(b) The date of the test and the condition of the equipment shall be noted in the official log book.

§ 78.17–5 *Valves and closing appliances.* (a) It shall be the duty of the master to see that all valves, including cross connecting valves where fitted, and other appliances such as port lights, closing mechanism of scuppers, ash chutes, and rubbish chutes, the closing of which is necessary to make a compartment watertight, are operated at least once in every week that the vessel is navigated to be assured that they are in proper operating condition. Any remote controls or indicating mechanisms shall be inspected at this time to test their efficiency. Where such valves are accessible, they shall be inspected at this time, otherwise, they shall be inspected at the first opportunity when they are accessible. On vessels in which the voyage exceeds one week in duration, these appliances shall be operated before the vessel leaves port.

(b) The date of the test and the condition of the equipment shall be noted in the official logbook.

§ 78.17–10 *Loudspeaker system.* (a) Where fitted, the complete loudspeaker system shall be tested at least once every week. This test shall be made by an officer of the vessel.

(b) The date of the test and the condition of the equipment shall be noted in the official logbook.

§ 78.17–15 *Steering gear, whistle, and means of communication.* (a) On all vessels making a voyage of more than 48 hours' duration, the entire steering gear, the whistle, and the means of communication between the bridge or pilothouse and the engine room shall be examined and tested by an officer of the vessel within a period of not more than 12 hours prior to departure. On all other vessels similar examinations and tests shall be made at least once every week.

(b) The date of the test and the condition of the equipment shall be noted in the official logbook.

§ 78.17–20 *Drafts and load line markings.* (a) The master of every vessel on an ocean, coastwise, or Great Lakes voyage shall enter the drafts of the vessel, forward and aft, in the official logbook when leaving port.

(b) On vessels subject to the requirements of Subchapter E (Load Lines) of this chapter, at the time of departure from port on an ocean, coastwise, or Great Lakes voyage, the master shall insert in the official logbook a statement of the position of the subdivision load line mark, port and starboard, in relation to the surface of the water in which the vessel is then floating.

(1) When the draft of the vessel is limited by a seasonal load line located below the subdivision load line, the position of the applicable seasonal load line shall be entered in relation to the surface of the water in which the vessel is floating.

(2) When an allowance for draft is made for density of the water in which the vessel is floating, this density is to be noted in the official logbook.

§ 78.17–25 *Sanitation.* (a) It shall be the duty of the master and chief engineer to see that the vessel, and, in particular, the passenger and crew quarters are in a clean and sanitary condition. The chief engineer shall be responsible only for the sanitary condition of the engineering department.

§ 78.17–30 *Examination of boilers and machinery.* (a) It shall be the duty of the chief engineer when he assumes charge of the boilers and machinery of a vessel to examine them thoroughly. If any parts thereof are in bad condition, or if the safety valve seals are broken, the fact shall immediately be reported to the master, owner or agent, and the Officer in Charge, Marine Inspection.

§ 78.17–35 *Hatches and other openings.* (a) It shall be the responsibility of the master to assure himself before leaving protected waters that all exposed cargo hatches of his vessel are closed and made properly tight.

(b) The following doors, portable plates, ports, and other openings shall be kept closed while the vessel is being navigated, and shall be closed before the vessel commences a voyage:

(1) Class 1 doors between cargo spaces provided in § 73.35–5 (c) of this subchapter.

(2) Portable plates in watertight bulkheads as provided in § 73.30–35 (a) of this subchapter.

(3) Gangway, cargo, and coaling ports fitted below the margin line.

(4) On ocean, coastwise, or Great Lakes vessels of 150 gross tons and over, all opening type port lights in a 'tween deck, if the sill of any port light in that 'tween deck, is below a line drawn parallel to the bulkhead deck at side and having its lowest point 4½ feet plus 2½ percent of the breadth of the vessel above the water when the vessel departs from port. The Commandant may indicate the limiting mean draft which would allow such port lights to be opened at sea.

(5) Port lights that are not accessible during navigation. Dead covers on such port lights shall also be secured.

(6) Port lights in spaces appropriated alternately to the carriage of cargo and passengers, when cargo is carried. Dead covers on such port lights shall also be secured.

(c) The time of opening and closing of hatches and other openings noted in this section shall be entered in the official log book. In the event that the master at his discretion does not secure the hatches, a notation of this fact shall be made in the official log book. If it becomes essential for the safety of the vessel to open any of the fittings noted in this section while at sea, the circumstances and the time of opening and closing shall be entered in the official log book.

(d) The time of opening, closing, and securing, at sea, of watertight doors fitted between bunkers for the purpose of trimming coal, shall be entered in the official log book.

§ 78.17–40 *Line-throwing appliances.* (a) On vessels fitted with a line-throwing appliance, it shall be the duty of the master to drill his crew in the use of such appliance, and require it to be fired at least once in every 3 months. Each drill shall be recorded in the vessel's official log book. The service line shall not be used for drill purposes. The drill shall be conducted as follows:

(1) For impulse-projected rocket type, by actually firing the rocket with any flexible line of proper size and length, suitably faked or laid out.

(2) For shoulder gun type, by actually firing, using the regular cartridge and projectile with any flexible line of proper size and length, suitably faked or laid out.

(3) For Lyle gun type, by actually firing, using 2½ ounces of powder, the regular service projectile with any flexible line of proper size and length suitably faked or laid out.

§ 78.17–45 *Emergency lighting and power systems.* (a) It shall be the duty of the master to see that the emergency lighting and power systems are operated and inspected at least once in each week that the vessel is navigated to be assured that the system is in proper operating condition.

(b) Internal combustion engine driven emergency generators shall be operated under load for at least 2 hours, at least once in each month that the vessel is navigated.

(c) Storage batteries for emergency lighting and power systems shall be tested at least once in each 6-month period that the vessel is navigated to demonstrate the ability of the storage battery to supply the emergency loads for the specified period of time.

(d) The date of the tests and the condition and performance of the apparatus shall be noted in the official log book.

§ 78.17–50 *Fire and boat drills.* (a) The master shall be responsible for conducting a fire and boat drill at least once in every week. In the case of a vessel where the duration of the voyage exceeds 1 week, a fire and boat drill shall be held before the vessel leaves port and at least once a week thereafter.

(b) The fire and boat drill shall be conducted as if an actual emergency existed. All hands should report to their respective stations and be prepared to perform the duties specified in the station bill.

(1) Fire pumps shall be started and a sufficient number of outlets used to ascertain that the system is in proper working order.

(2) All rescue and safety equipment shall be brought from the emergency equipment lockers and the persons designated shall demonstrate their ability to use the equipment.

(3) All watertight doors which are in use while the vessel is under way and all fire doors shall be operated.

(4) Weather permitting, lifeboat covers and strongbacks shall be removed, plugs or caps put in place, boat ladders secured in position, painters led forward and tended, and other lifesaving equipment prepared for use. The motor and hand-propelling gear of each lifeboat, where fitted, shall be operated for at least 5 minutes.

(5) The passengers shall be encouraged to fully participate in these drills and shall be instructed in the use of the life preservers.

(6) In port, the unobstructed lifeboats shall be lowered to the water and the crew exercised in the use of the oars and other means of propulsion if provided for the lifeboat. Although all lifeboats may not be used in a particular drill, care shall be taken that all lifeboats are given occasional use to ascertain that all lowering equipment is in proper order and the crew properly trained. The master shall be responsible that each lifeboat is lowered to the water at least once in each 3 months.

(7) When the vessel is under way, and weather permitting, all lifeboats shall be swung out to ascertain that the gear is in proper order.

(8) The person in charge of each lifeboat shall have a list of its crew and shall see that the men under his command are acquainted with their duties.

(c) It shall be the duty of the master to ascertain that in connection with the fire and boat drills, or at other times, each member of the crew except female members has been drilled and exercised in pulling oars in lifeboats at least once in each 3 months. In addition, the crew of each motor-propelled lifeboat shall demonstrate their ability in the working of the engine and handling of the lifeboat under power, and the crew of each hand-propelled lifeboat shall demon-

strate their ability in the operation of the hand-propelling gear and the operation of the lifeboat under hand power within the same time.

(d) An entry shall be made in the vessel's official log book relative to each fire and boat drill setting forth the date and hour, length of time of the drill, numbers on the lifeboats swung out, the length of time that motor and hand-propelled lifeboats are operated, the number of lengths of hose used, together with a statement as to the condition of all fire and lifesaving equipment, watertight door mechanisms, valves, etc.

(e) The master of every vessel shall report monthly, on Form CG 941, the date of such drills, the number of lifeboats aboard and the numbers on the lifeboats that were swung out at each drill, the condition of the vessel and her equipment, and the number of passengers carried. This report shall be made to the office of the Coast Guard District Commander of the district where the vessel was last inspected.

(f) Three copies of this part, Form CG 809a, shall be framed under glass and posted in conspicuous places about the vessel. These forms may be obtained from the Officer in Charge, Marine Inspection.

§ 78.17–55 *Electric power operated lifeboat winches.* (a) It shall be the duty of the master to see that all lifeboat winch control apparatus, including motor controllers, emergency switches, master switches, and limit switches, are examined at least once in each 3 months. The examination shall include the removal of drain plugs and/or the opening of drain valves in such appliances to assure that the enclosures are free of water.

(b) The date of the examinations required by this section and the condition of the equipment shall be noted in the official log book.

§ 78.17–60 *Lifeboats, life rafts, life floats, and buoyant apparatus.* (a) The master shall assign to one or more officers the duty of seeing that the lifeboats, life rafts, life floats, and buoyant apparatus are at all times ready for immediate use. The decks on which such equipment are stowed shall be kept clear of cargo or any other obstructions which would interfere with the immediate launching of such equipment.

(b) Where motor-propelled lifeboats are carried, the motor of each lifeboat shall be operated in the ahead and astern position for a period of not less than 5 minutes at least once in each week.

(c) All lifeboats, and life rafts shall be stripped, cleaned, and thoroughly overhauled at least once in every year. When lifeboats are removed from a vessel for this purpose on a rotational basis, the installation test prescribed by Subpart 75.35 need not be made.

(d) The fuel tanks of all motor-propelled lifeboats shall be emptied and the fuel changed at least once in every year.

(e) All life floats and buoyant apparatus shall be cleaned and thoroughly overhauled at least once in every year.

§ 78.17–65 *Smoke detecting system.* (a) It shall be the duty of the master to see that the smoke inlets in cargo holds are examined at least once in each 3 months by the ship's personnel to determine if the inlets are obstructed by corrosion, paint, dust, or other extraneous matter. Smoke tests shall be made in all holds and the system found or made operable. The date of the test and condition of the system shall be entered in the log.

SUBPART 78.20—STEERING ORDERS

§ 78.20–1 *Method of communicating.* (a) All steering orders shall be given and communicated in terms of "right rudder" where it is intended that the top of the wheel, the rudder blade, and the head of the ship should go to the right, and "left rudder" where it is intended that the top of the wheel, the rudder blade, and the head of the ship should go to the left.

SUBPART 78.23—WHISTLING

§ 78.23–1 *Unnecessary whistling prohibited.* (a) The unnecessary sounding of the vessel's whistle is prohibited within any harbor limits of the United States.

SUBPART 78.25—UNAUTHORIZED LIGHTS

§ 78.25–1 *Unauthorized lights prohibited.* (a) The master shall not authorize or permit the carrying of any lights not required by law that in any way will interfere with the distinguishing of the signal lights.

SUBPART 78.27—SEARCHLIGHTS

§ 78.27–1 *Improper use prohibited.* (a) No person shall flash or cause to be flashed the rays of a searchlight or other blinding light onto the bridge or into the pilothouse of any vessel under way.

SUBPART 78.30—LOOKOUTS, PILOTHOUSE WATCH, PATROLMEN, AND WATCHMEN

§ 78.30–1 *Lookouts required.* (a) All ocean and coastwise vessels shall have a lookout at all times at or near the bow during the nighttime.

§ 78.30–5 *Pilothouse watch.* (a) In addition to the licensed officer or pilot, there shall be at least one member of the crew also on watch in or near the pilothouse at all times when the vessel is being navigated.

§ 78.30–10 *Supervised patrol.* (a) The provisions of this section shall apply to all vessels on an international voyage, and to all other vessels having berthed or stateroom accommodations for passengers. This section shall be applicable at all times when passengers are on board.

(b) Between the hours of 10 p. m. and 6 a. m., a supervised patrol shall be maintained so as to completely cover all parts of the vessel accessible to passengers or crew, excepting occupied sleeping accommodations and machinery spaces and similar spaces where a regular watch is maintained.

(c) Clocks, keys, and recording apparatus shall be of an approved type. The station boxes shall have seals placed over the securing screws in order to leave evidence of removal or tampering.

(d) Clocks or key stations shall be so arranged throughout the vessel so as to assure complete coverage of all accessible spaces required by paragraph (b) of this section. The number and location of recording stations, the order in which they are visited, and the number undertaken by one patrolman shall be specifically approved. The stations shall be numbered as required by § 78.47–23. Sufficient watchmen shall be available so that each space will be covered at least once in every hour except as follows:

(1) On existing vessels not constructed in general agreement with §§ 72.05–5 through 72.05–60, of this subchapter, the supervised patrol shall cover all spaces required by paragraph (b) of this section at least once in every 20 minutes.

(2) Public spaces, not constructed with incombustible veneers and trim and fitted with fire resistant furnishings, shall have either an approved fire detecting system installed in such spaces or the supervised patrol shall cover these spaces at least once in every 20 minutes.

(e) The patrolman shall report to the bridge at least once an hour on vessels where the supervised patrol system is not equipped with a recording apparatus in the control station. In vessels requiring more than one patrol route, one patrolman may contact others and make a joint report to the bridge. Failure of a patrolman to follow a prescribed route, or to record each station within the specified time, shall be entered on the record along with the reason for the irregularity.

(f) The patrolman while on duty shall wear a distinctive uniform or badge, and shall have in his possession at all times an efficient flashlight.

(g) A patrolman on duty shall have no other tasks assigned to him.

§ 78.30–15 *Watchmen.* (a) The provisions of this section shall apply to all vessels not required to have a supervised patrol under the provisions of § 78.30–10. This section shall be applicable at all times when passengers are on board.

(b) During the nighttime, a suitable number of watchmen shall be stationed in the passenger accommodation areas on each deck.

(c) Watchmen shall be under the direct charge of the master or officer in command of the vessel, and shall report to such officer at the pilothouse at fixed intervals not exceeding one hour. Watchmen shall not be required to perform any other duties while on watch.

(d) The uniform of the night watchman shall be conspicuously different from other persons so as to be readily distinguished. A rating badge marked "Watchman" shall be worn on the left sleeve and the front of the cap shall also be marked "Watchman".

(e) The watchman shall have in his possession at all times while on duty an efficient flashlight.

§ 78.30–20 *Master's and officer's responsibility.* (a) Nothing in this subpart shall exonerate any master or officer in command from the consequences of any neglect to keep a proper lookout or to maintain a proper fire watch or from any neglect of any precaution which may be required by the ordinary practice of seamen or by the special circumstances of the case. When

circumstances require it, additional watches shall be maintained to guard against fire or other danger and to give an alarm in case of accident or disaster.

SUBPART 78.33—REPORTS OF ACCIDENTS, REPAIRS, AND UNSAFE EQUIPMENT

§ 78.33–1 *Repairs of boiler and pressure vessels.* (a) Before making any repairs to boilers or unfired pressure vessels, the chief engineer shall submit a report covering the nature of the repairs to the Officer in Charge, Marine Inspection, at or nearest the port where the repairs are to be made.

§ 78.33–5 *Accidents to machinery.* (a) In the event of an accident to a boiler, unfired pressure vessel, or machinery tending to render the further use of the item unsafe until repairs are made, or if by ordinary wear such items become unsafe, a report shall be made by the chief engineer immediately to the Officer in Charge, Marine Inspection, or if at sea, immediately upon arrival at port.

§ 78.33–10 *Notice required before repairs.* (a) No repairs or alterations, except in an emergency, shall be made to any lifesaving or fire detecting or extinguishing equipment without advance notice to the Officer in Charge, Marine Inspection. When emergency repairs or alterations have been made, notice shall be given to the Officer in Charge, Marine Inspection, as soon as practicable.

§ 78.33–15 *Fusible plugs.* (a) It shall be the duty of the chief engineer to report the installation of new fusible plugs to the Officer in Charge, Marine Inspection, on Form CG 945, in accordance with § 61.45–20 of Subchapter F (Marine Engineering) of this chapter.

SUBPART 78.35—CABLE TRAVELER

§ 78.35–1 *When required.* (a) On vessels where the distance between deck houses is more than 150 feet, a wire cable shall be stretched between the deck houses at all times when the vessel is navigating in other than protected waters. As many loose rings with lanyards shall be attached as deemed necessary by the master. In any case, a properly constructed raised catwalk or raised bridge or a below deck passage may be substituted for the required cable.

SUBPART 78.37—LOG BOOK ENTRIES

§ 78.37–1 *Log books and records.* (a) Under the various statutes, vessels engaged in all trades with the exception of vessels engaged exclusively in trade on rivers of the United States, are required to maintain an official log book. The official log book, which is furnished gratuitously to masters of all vessels by the Coast Guard, shall be used in making entries required by this subchapter in the case of vessels making foreign or intercoastal voyages. On other vessels, this log book, or any other form which represents the official log book, may be used for this purpose. With respect to vessels in this latter category, the official log book shall be available for review by the inspector for a period of at least one year after the date to which the records refer.

§ 78.37–5 *Actions required to be logged.* (a) The actions and observations noted in this section shall be entered in the official log book. This section contains no requirements which are not made in other portions of this subchapter, the items being merely grouped together for convenience.

(1) Fire and Boat Drills: Weekly. See § 78.17–50.

(2) Watertight door operation: Daily and Weekly. See § 78.17–1.

(3) Valve and closing appliance operation: Weekly. See § 78.17–5.

(4) Loudspeaker system: Weekly. See § 78.17–10.

(5) Steering gear, whistle, and means of communication: Prior to departure. See § 78.17–15.

(6) Drafts and load line markings: Prior to leaving port, ocean, coastwise, and Great Lakes services only. See § 78.17–20.

(7) Hatches and other openings: All openings and closings, or leaving port without closing, except vessels on protected waters. See § 78.17–35.

(8) Line throwing appliances: Once every 3 months. See § 78.17–40.

(9) Emergency lighting and power systems: Weekly and semiannually. See § 78.17–45.

(10) Electric power operated lifeboat winches: Once every 3 months. See § 78.17–55.

(11) Smoke Detecting System: Once every 3 months. See § 78.17–65.

§ 78.37–10 *Official log entries.* (a) In addition to other items required to be entered into the official log book, on vessels where an official log book is required, all items relative to the crew and passengers and to casualties shall be entered as required by R. S. 4290, as amended (46 U. S. C. 201).

SUBPART 78.40—VEHICULAR FERRIES

§ 78.40–1 *Stowage of vehicles.* (a) Automobiles or other vehicles shall be stowed in such a manner as to permit both passengers and operators to get out and away from them freely in the event of fire or other disaster. Where there is insufficient clearance to provide for easy egress at all times, both passengers and operators shall be directed to leave their vehicles and to occupy other spaces reserved for them during the crossing. The decks, where necessary, shall be definitely marked with painted lines to indicate the vehicle runways and the aisle spaces.

§ 78.40–5 *Securing of vehicles.* (a) The master shall take all necessary precautions to see that automobiles or other vehicles have their motors turned off when the ferry is under way, and the motors shall not be started until the ferry is secured to the landing. In addition, the vehicles at each end shall have their wheels securely blocked, while the vessel is being navigated.

§ 78.40–10 *No smoking permitted.* (a) The master shall have appropriate "No Smoking" signs posted and shall take all necessary precautions to prevent smoking or carrying of lighted or smoldering cigars, cigarettes, etc., in the deck area assigned to automobiles or other vehicles.

SUBPART 78.43—RAILROAD PASSENGER CAR FERRIES

§ 78.43–1 *Precautions for railway passenger cars.* (a) It shall be the duty of the master of any railroad passenger car ferry to see that all of the doors of the cars are unlocked and that the vestibules of the cars are open while the cars are on the ferry, to allow the persons so carried free access at all times.

SUBPART 78.45—DISPLAY OF PLANS

§ 78.45–1 *When required.* (a) Vessels of 1,000 gross tons and over, and vessels of any tonnage on an international voyage shall have permanently exhibited for the guidance of the officer in charge of the vessel, general arrangement plans showing for each deck the various fire sections enclosed by fire retardant bulkheads together with particulars of the fire detecting, manual alarm, and fire extinguishing systems, fire doors, means of ingress to the different compartments, and the ventilating systems including the positions of the dampers and the identification of the fans serving each section.

SUBPART 78.47—MARKINGS FOR FIRE AND EMERGENCY EQUIPMENT, ETC.

78.47–1 *Application.* (a) The provisions of this subpart with the exception of § 78.47–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 78.47–90.

§ 78.47–3 *General.* (a) It is the intent of this subpart to provide such markings as are necessary for the guidance of the persons on board in case of emergency. In any specific case, and particularly on small vessels, where it can be shown to the satisfaction of the Officer in Charge, Marine Inspection, that the prescribed markings are unnecessary for the guidance of the persons on board in case of emergency, such markings may be modified or omitted.

(b) In addition to English, all stateroom notices, directional signs, etc., shall be printed in languages appropriate to the service of the vessel or other action be taken to achieve the same purpose.

(c) Where in this subpart red letters are specified, letters of a contrasting color on a red background will be accepted.

§ 78.47–5 *General alarm bell switch.* (a) The general alarm bell switch in the pilothouse, and in the fire control station, if also located there, shall be clearly and permanently identified by lettering on a metal plate or with a sign in red letters on a suitable background: "GENERAL ALARM."

§ 78.47–7 *General alarm bells.* (a) All general alarm bells shall be identified by red lettering at least ½ inch high: "GENERAL ALARM—WHEN BELL RINGS GO TO YOUR STATION."

§ 78.47–9 *Carbon dioxide alarm.* (a) All carbon dioxide alarms shall be conspicuously identified: "WHEN ALARM SOUNDS—VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED."

§ 78.47–10 *Manual alarm boxes.* (a) In all new installations, manual alarm

boxes shall be clearly and permanently marked "IN CASE OF FIRE BREAK GLASS." Existing boxes not so marked with the same or equivalent wording, shall be identified either on the box or adjacent bulkhead in at least ½ inch letters "IN CASE OF FIRE BREAK GLASS." All manual alarm boxes shall be numbered in red on the adjacent bulkhead with at least ½ inch figures. The number shall agree with the number of the zone.

§ 78.47–13 *Fire detecting and manual alarm, automatic sprinkler, and smoke detecting alarm bells.* (a) The fire detecting and manual alarm automatic sprinkler, and smoke detecting alarm bells in the engine room shall be identified by at least 1 inch red lettering "FIRE ALARM", "SPRINKLER ALARM" or "SMOKE DETECTING ALARM" as appropriate. Where such alarms on the bridge or in the fire control station do not form a part of an easily identifiable alarm cabinet, the bells shall be suitably identified as above.

§ 78.47–15 *Fire extinguishing system branch lines.* (a) The branch line valves of all fire extinguishing systems shall be plainly and permanently marked indicating the spaces served.

§ 78.47–17 *Fire extinguishing system controls.* (a) The control cabinets or spaces containing valves or manifolds for the various fire extinguishing systems shall be distinctly marked in conspicuous red letters at least 2 inches high—"STEAM FIRE APPARATUS", "CARBON DIOXIDE FIRE APPARATUS", FOAM FIRE APPARATUS", "WATER SPRAY FIRE APPARATUS", "MANUAL SPRINKLING SYSTEM", or "AUTOMATIC SPRINKLING SYSTEM", as the case may be.

§ 78.47–20 *Fire hose stations.* (a) Each fire hydrant shall be identified in red letters and figures at least 2 inches high "FIRE STATION NO. 1," "2," "3," etc. Where the hose is not stowed in the open or behind glass so as to be readily seen, this identification shall be so placed as to be readily seen from a distance.

§ 78.47–23 *Supervised patrol stations.* (a) Each supervised patrol clock or key station shall be numbered.

§ 78.47–25 *Emergency squad equipment.* (a) Lockers or spaces containing equipment for the use of the emergency squad shall be marked "EMERGENCY SQUAD EQUIPMENT."

§ 78.47–27 *Self-contained breathing apparatus and gas masks.* (a) Lockers or spaces containing self-contained breathing apparatus or gas masks shall be marked "SELF-CONTAINED BREATHING APPARATUS" or "GAS MASK."

§ 78.47–30 *Hand portable fire extinguishers.* (a) Each hand portable fire extinguisher shall be marked with a number and the location where stowed shall be marked with a corresponding number at least ½ inch high. Where only one type and size of hand portable fire extinguisher is carried, the numbering may be omitted.

§ 78.47–33 *Emergency lights.* (a) All emergency lights shall be marked with a letter "E" at least ½ inch high.

§ 78.47–35 *Fire doors.* (a) All doors in main vertical zone bulkheads or stairway enclosures, except from individual rooms such as staterooms, fan rooms, lockers, etc., shall be numbered conspicuously on an etched plate or equivalent in not less than ⅜ inch letters and figures "F. S. D. 1," "2," "3," etc. If stenciled or similar notice is used, the letters and figures shall be at least 1 inch high. The number shall be conspicuous with the door in the open position.

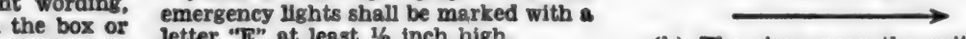
§ 78.47–37 *Watertight doors.* (a) All watertight doors in subdivision bulkheads shall be numbered conspicuously on both sides on an etched plate or equivalent in not less than ⅜ inch letters and figures "W. T. D. 1," "2," "3," etc. If a stencilled or similar notice is used, the letters and figures shall be at least 1 inch high. If the construction is such that the number cannot be seen with the door in the open position, a similar number shall be placed on the frame or other location immediately adjacent to the door. All watertight door remote control stations shall be marked in the same manner, and in addition, the direction of operation of the lever or wheel to open and close the door shall be conspicuously marked.

§ 78.47–40 *Exit signs.* (a) Illuminated signs bearing the word "EXIT" in red letters shall be installed in such locations throughout the vessel that from any portion of the vessel normally accessible to the passengers or crew, except machinery spaces, and stores and similar spaces where the crew are not normally employed, so that, with all fire doors in stairway inclosures and main vertical zone bulkheads and all watertight doors closed, the direction of escape to the open deck will be apparent. For the purpose of this paragraph, individual staterooms and other similar small rooms will not be required to have such signs, but upon emerging from such rooms the direction of escape should be apparent. The power for the illuminated exit signs shall be from the emergency switchboard.

(b) Small rooms or spaces having a secondary means of escape which is not obviously apparent shall have a suitable sign in red letters "EMERGENCY EXIT" directing attention to such escape.

§ 78.47–43 *Embarkation direction signs to lifeboats.* (a) Sufficient embarkation direction signs shall be installed in passageways, stairways, etc., throughout the vessel that from any portion of the vessel normally accessible to the passengers or crew, and with all fire doors in stairway enclosures and main vertical zone bulkheads and all closed watertight doors in subdivision bulkheads, the direction of the shortest route to follow to reach the lifeboats will be apparent. The signs shall be in at least 1 inch letters with arrows of appropriate dimensions:

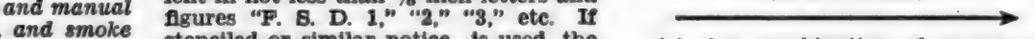
TO BOATS



(b) The signs near the exits to the embarkation deck shall be similar to the above, and shall indicate the boat stations nearest to the exit:

TO BOAT STATIONS

NOS. 1, 3, 5
(or 2, 4, 6, etc.)



(c) Any combination of arrows and one inch lettering which will clearly indicate the direction to be followed will be acceptable.

§ 78.47–45 *Lifeboat stations.* (a) There shall be placed on the deck beams or suspended athwartship from overhead at each lifeboat station on the embarkation deck a sign in three-inch letters "LIFEBOAT STATION NO. 1," "2," "3," etc. If there is insufficient head room or no overhead structure at a boat station, a similar sign shall be permanently installed where it will be readily seen.

§ 78.47–47 *Stateroom notices.* (a) Framed notices shall be conspicuously posted in the passenger staterooms indicating the following which may be posted separately or together.

(1) Emergency signal:

EMERGENCY SIGNALS

FIRE AND EMERGENCY—CONTINUOUS RAPID RINGING OF THE SHIP'S BELL AND OF THE GENERAL ALARM BELLS FOR A PERIOD OF NOT LESS THAN 10 SECONDS.

ABANDON SHIP (OR BOAT STATIONS)—MORE THAN 6 SHORT BLASTS AND ONE LONG BLAST OF THE WHISTLE SUPPLEMENTED BY THE SAME SIGNAL ON THE GENERAL ALARM BELLS.

THE OCCUPANTS OF THIS ROOM ARE ASSIGNED TO LIFEBOAT NO. _____. ALL PASSENGERS ARE REQUIRED TO PUT ON LIFE PRESERVERS AND GO TO THEIR LIFEBOAT STATIONS WHENEVER GENERAL ALARM BELLS RING.

THE ROOM STEWARD WILL PROVIDE LIFE PRESERVERS FOR CHILDREN AT THE START OF THE VOYAGE.

(2) Life preservers: The location of life preservers together with instructions and pictures showing how they are worn shall be indicated in a framed notice.

§ 78.47–50 *Children's life preservers.* (a) The lockers or boxes in which children's life preservers are stowed and also the number contained therein shall be marked in at least two inch letters and figures:

20
CHILDREN'S LIFE PRESERVERS

§ 78.47–53 *Automatic ventilation dampers.* (a) The manual operating positions for automatic fire dampers in ventilation ducts passing through main vertical zone bulkheads shall be identified by red letters at least ½ inch high "VENTILATION FIRE DAMPER." In addition, the open and closed positions shall be similarly marked.

§ 78.47–55 *Instructions for changing steering gear.* (a) Instructions in at

least ½ inch letters and figures shall be posted in the steering engine room, relating in order, the different steps to be taken in changing to the emergency steering gear. Each clutch, gear, wheel, lever, valve or switch which is used during the change-over shall be numbered or lettered on a metal plate or painted so that the markings can be recognized at a reasonable distance. The instructions shall indicate each clutch or pin to be "in" or "out" and each valve or switch which is to be "opened" or "closed" in shifting to any means of steering for which the vessel is equipped. Instructions shall be included to line up all steering wheels and rudder amidship before changing gears.

§ 78.47–57 *Rudder orders.* (a) At all steering stations, there shall be installed a suitable notice on the wheel or device or in such other position as to be directly in the helmsman's line of vision, to indicate the direction in which the wheel or device must be turned for "right rudder" and for "left rudder."

§ 78.47–60 *Lifeboats.* (a) The name of the vessel shall be plainly marked or painted on each side of the bow of each lifeboat in letters not less than 3 inches high.

(b) The number of each lifeboat shall be plainly marked or painted on each side of the bow of each lifeboat in figures not less than 3 inches high. The lifeboats on each side of the vessel shall be numbered from forward aft, with the odd numbers on the starboard side. Where nested lifeboats are permitted, the upper lifeboat shall be numbered in the normal manner and the lower lifeboat shall have the same number followed by the letter "A".

(c) The cubical contents and number of persons allowed to be carried in each lifeboat shall be plainly marked or painted on each side of the bow of each lifeboat in letters and numbers not less than 1½ inches high. In addition, the number of persons allowed shall be plainly marked or painted on top of at least 2 thwarts in letters and numbers not less than 3 inches high.

(d) All oars shall be conspicuously marked with the vessel's name.

(e) Where mechanical disengaging apparatus is used, the control effecting the release of the lifeboat shall be painted bright red and shall have thereon in raised letters the words "DANGER—LEVER RELEASES HOOKS".

§ 78.47–63 *Life rafts, life floats, and buoyant apparatus.* (a) Life rafts, life floats, and buoyant apparatus, together with their oars and paddles, shall be conspicuously marked with the vessel's name.

(b) The number of persons allowed on each life raft, life float, and buoyant apparatus shall be conspicuously marked or painted thereon in letters and numbers at least 1½ inches high.

§ 78.47–65 *Life preservers, wood floats, and ring life buoys.* (a) All life preservers, wood floats, and ring life buoys shall be marked with the vessel's name.

§ 78.47–67 *Fire hose and axes.* (a) All fire hose and axes shall be marked with the vessel's name.

§ 78.47–70 *Portable magazine chests.* (a) Portable magazine chest shall be marked in letters of at least 3 inches high "PORTABLE MAGAZINE CHEST—INFLAMMABLE—KEEP LIGHTS AND FIRE AWAY".

§ 78.47–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the requirements of this paragraph.

(1) The requirements of §§ 78.47–5 through 78.47–70 shall be met with the exception that existing signs and markings containing the same general intent, but not necessarily identical wording or exact letter type, size, or color, may be retained so long as they are in good condition to the satisfaction of the Officer in Charge, Marine Inspection.

SUBPART 78.50—MARKINGS ON VESSELS

§ 78.50–1 *Application.* (a) The provisions of this subpart shall apply to all vessels except as specifically noted in this subpart.

§ 78.50–5 *Markings required by customs regulations.* (a) The following markings are required by the Customs Regulations. Details of the application of the requirements as well as details of the required markings will be found in those regulations:

(1) Name of Vessel—On both bows and the stern. On steam vessels the name is also required on both sides of the pilothouse, and on steam paddle wheel vessels on the outer side of each paddle box.

(2) Hailing Port—On the stern.

(3) Draft Marks—On the stem and stern. Also see § 78.50–10.

(4) Official Number—On the vessel's main beam.

(5) Net Tonnage—On the vessel's main beam.

§ 78.50–10 *Draft marks.* (a) All vessels 50 gross tons and over, under the jurisdiction of the U. S. Coast Guard, shall have the draft of the vessel plainly and legibly marked upon the stem and upon the sternpost or rudderpost or at any place at the stern of the vessel as may be necessary for easy observance. The draft shall be taken from the bottom of the keel at the marks to the surface of the water, the bottom of the mark to indicate the draft in feet.

(b) In cases where the keel does not extend forward or aft to the location of the draft marks, due to raked stem or cut-away skeg, the datum line from which the draft shall be taken shall be obtained by projecting the line of the bottom of keel forward or aft, as the case may be, to the location of the draft marks.

(c) In cases where a vessel may have a skeg or other appendage extending locally below the line of the keel, the draft at the end of the vessel adjacent to such appendage shall be measured to a line tangent to the lowest part of such appendage and parallel to the line of the bottom of the keel.

§ 78.50–15 *Load line marks.* (a) Vessels assigned a load line shall have the deck line and the load line marks permanently scribed or embossed as required by Subchapter E (Load Lines) of this chapter.

SUBCHAPTER 78.53—PLACARD OF BREECHES BUOY INSTRUCTIONS

§ 78.53–1 *Application.* (a) The provisions of this subpart shall apply to all vessels on an international voyage and all other vessels of 150 gross tons and over in ocean, coastwise, or Great Lakes service.

§ 78.53–5 *Where posted.* (a) A placard containing instructions for the use of breeches buoys, Form CG 811, shall be posted in the pilothouse, the engine room, and the crew quarters of all vessels.

SUBPART 78.55—CARRYING OF EXCESS STEAM

§ 78.55–1 *Master and Chief engineer responsible.* (a) It shall be the duty of the master and the engineer in charge of the boilers of any vessel to see that a steam pressure is not carried in excess of that allowed by the certificate of inspection, and to see that the safety valves, once set and sealed by the inspector, are in no way tampered with or made inoperative except as provided in § 57.10–20 (b) (3) of Subchapter F (Marine Engineering) of this chapter.

SUBPART 78.57—ROUTING INSTRUCTIONS

§ 78.57–1 *All personnel must comply.* (a) Due to existing mine field dangers, all licensed masters, officers, and certificated seamen on United States vessels shall comply strictly with the routing instructions issued by competent naval authority. Failure to comply with such routing instructions shall be deemed misconduct within the meaning of R. S. 4450, as amended (46 U. S. C. 239). Nothing herein shall be construed as relieving the master of the responsibility for the safety of his vessel.

SUBPART 78.60—COMPLIANCE WITH PROVISIONS OF CERTIFICATE OF INSPECTION

§ 78.60–1 *Master or person in charge responsible.* (a) It shall be the duty of the master or other person in charge of the vessel to see that all of the provisions of the certificate of inspection are strictly adhered to. Nothing in this subpart shall be construed as limiting the master or other person in charge of the vessel, at his own responsibility, from diverting from the route prescribed in the certificate of inspection or taking such other steps as he deems necessary and prudent to assist vessels in distress or for other similar emergencies.

SUBPART 78.65—EXHIBITION OF LICENSE

§ 78.65–1 *Licensed officers.* (a) All licensed officers on a vessel shall have their licenses conspicuously displayed as required by R. S. 4446, as amended (46 U. S. C. 232).

§ 78.65–5 *Motorboat operators.* (a) The operator of any motorboat shall have his license as a motorboat operator in his possession and available for immediate production to any Coast Guard boarding officer at all times when the motorboat is being operated.

PART 79—INSPECTION OF VESSELS

Part 79 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 80—FERRYBOATS

Part 80 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 81—EXCURSION STEAMERS

Part 81 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 82—BARGES

Part 82 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 83—DUTIES OF INSPECTORS

Part 83 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter I—Cargo and Miscellaneous Vessels

The title for Subchapter I is changed from "General Rules and Regulations; Bays, Sounds, and Lakes Other Than the Great Lakes" to "Cargo and Miscellaneous Vessels," and Chapter I is amended by adding a new Part 90 to Subchapter I reading as follows:

PART 90—GENERAL PROVISIONS

SUBPART 90.01—AUTHORITY AND PURPOSE

Sec.
90.01-1 Purpose of regulations.
90.01-5 Assignment of functions.
90.01-10 Authority for regulations.

SUBPART 90.05—APPLICATION

90.05-1 Vessels subject to requirements of this subchapter.
90.05-5 Specific application noted in text.

SUBPART 90.10—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

90.10-1 Approved.
90.10-3 Carrying passengers for hire.
90.10-5 Carrying freight for hire.
90.10-7 Commandant.
90.10-9 Coast Guard District Commander.
90.10-11 Coastwise.
90.10-13 Great Lakes.
90.10-15 Headquarters.
90.10-17 International voyage.
90.10-19 Lakes, bays, and sounds.
90.10-21 Marine inspector or inspector.
90.10-23 Motorboat.
90.10-25 Ocean.
90.10-27 Officer in Charge, Marine Inspection.
90.10-29 Passenger.
90.10-31 Pilot rules.
90.10-33 Rivers.
90.10-35 Recognized classification society.
90.10-37 Vessel.
90.10-39 Western rivers.

SUBPART 90.15—EQUIVALENTS

90.15-1 Conditions under which equivalents may be used.

SUBPART 90.20—GENERAL MARINE ENGINEERING REQUIREMENTS

90.20-1 Marine engineering details.

SUBPART 90.25—GENERAL ELECTRICAL ENGINEERING REQUIREMENTS

Sec.
90.25-1 Electrical engineering details.

SUBPART 90.30—SPECIAL PROVISIONS

90.30-1 Vessels acquired or documented under the act of June 6, 1941.
90.30-5 Installations of equipment made during the unlimited national emergency declared by the President on May 27, 1941.

SUBPART 90.35—AMERICAN BUREAU OF SHIPPING'S STANDARDS

90.35-1 Standards to be used.
90.35-5 Where obtainable.

AUTHORITY: §§ 90.01-1 to 90.35-5 issued under R. S. 4405, as amended, 4462, as as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4426, as amended, secs. 1, 2, 49 Stat. 1544, as amended, sec. 17, 54 Stat. 166, sec. 2, 54 Stat. 1028, as amended, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 404, 367, 526p, 463a, 50 U. S. C. App. 1275.

SUBPART 90.01—AUTHORITY AND PURPOSE

§ 90.01-1 *Purpose of regulations.* (a) The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for cargo and miscellaneous vessels, as listed in Column 5 of Table 90.05-1, in accordance with the intent of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various International Conventions for Safety of Life at Sea and other treaties which affect the merchant marine. The regulations are necessary to carry out the provisions of law affecting cargo and miscellaneous vessels and such regulations have the force of law.

§ 90.01-5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950 (15 F. R., 4935, 5 U. S. C. note under 241), effective July 31, 1950, the functions formerly vested in the Commandant, United States Coast Guard, were transferred to the Secretary of the Treasury, with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 90-01-10 *Authority for regulations—*(a) *General.* (1) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375 and 416), as well as in other provisions of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) *Inspection and certification.* (1) The regulations regarding inspection of cargo and miscellaneous vessels interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4423, 4426-4431, 4433, 4434, and 4453, as amended, sec. 14, 29 Stat. 690, secs. 10 and 11, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1544, 1935, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 361, 362, 391, 392, 399, 400-409, 411, 412, 435, 366, 395, 396, 363, 367, 660a, and 50 U. S. C. App. 1275).

(c) *Construction and arrangement.* (1) The regulations regarding the construction and arrangement of cargo and miscellaneous vessels interpret or apply R. S. 4417, 4418, 4426, and 4490, as amended, 41 Stat. 305, secs. 1 and 2, 49 Stat. 1544, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 482, 483, 363, 367, 463a, and 50 U. S. C. App. 1275).

(d) *Stability.* (1) The regulations regarding stability of cargo and miscellaneous vessels interpret or apply R. S. 4417, 4418, 4426, and 4490, as amended, 41 Stat. 305, sec. 2, 45 Stat. 1943, sec. 2, 49 Stat. 888, secs. 1 and 2, 49 Stat. 1544, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 482, 483, 363, 85a, 88a, 367, and 50 U. S. C. App. 1275).

(e) *Lifesaving equipment.* (1) The regulations regarding lifesaving equipment of cargo and miscellaneous vessels interpret or apply R. S. 4417, 4418, 4426, 4481, 4482, 4488, and 4491, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 474, 475, 481, 489, 367, 526p, and 50 U. S. C. App. 1275).

(f) *Fire protection equipment.* (1) The regulations regarding fire protection equipment of cargo and miscellaneous vessels interpret or apply R. S. 4417, 4418, 4426, 4470, 4471, 4477, 4479, and 4483, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 2, 54 Stat. 1028, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 463, 464, 470, 472, 476, 367, 526p, 463a, and 50 U. S. C. App. 1275).

(g) *Vessel control and miscellaneous systems and equipment.* (1) The regulations regarding vessel control and miscellaneous systems and equipment of cargo and miscellaneous vessels interpret or apply R. S. 4417, 4418, and 4426, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, and sec. 5, 55 Stat. 244, 245 (46 U. S. C. 391, 392, 404, 367, 526p, and 50 U. S. C. App. 1275).

(h) *Operations.* (1) The regulations regarding operations of cargo and miscellaneous vessels interpret or apply R. S. 4417, 4418, 4426, and 4453, as amended, secs. 1 and 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, and sec. 5, 55 Stat. 244, 245, as amended (46 U. S. C. 391, 392, 404, 435, 367, 526p, and 50 U. S. C. App. 1275).

SUBPART 90.05—APPLICATION

§ 90.05-1 *Vessels subject to requirements of this subchapter.* (a) This subchapter shall be applicable to all United States flag vessels indicated in Column 5 of Table 90.05 (a) and to all such foreign vessels which carry 12 or less passengers from any port in the United States to the extent prescribed by law, except as follows:

(1) Any vessel of a foreign nation signatory to the International Convention for the Safety of Life at Sea, 1948, and which has on board a current, valid safety equipment certificate.

TABLE 90.05-1 (a)

Method of propulsion	Size or other limitations	Classes of vessels (including motorboats) examined or inspected under various Coast Guard regulations			
		Vessels inspected and certificated under Subchapter D—Tank Vessels [1]	Vessels inspected and certificated under Subchapter H—Passenger Vessels [1] [2]	Vessels inspected and certificated under Subchapter I—Cargo and Miscellaneous Vessels [1] [2]	Vessels subject to provisions of Subchapter C—Uninspected Vessels [1] [2] [3]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Steam	Vessels 40 feet in length and under.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tugboats and towboats.	All vessels except those covered by Subchapters D and I.
	Vessels over 40 but not over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tugboats and towboats.	All vessels except those covered by Subchapters D and I.[5]
	Vessels over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew. 3. Towing and fishing vessels, in other than ocean and coastwise service, issued a permit to carry persons on the legitimate business of the vessel, in addition to the crew, but not to exceed one for each net ton of the vessel.	All vessels except those covered by Subchapters D and H.	None.
Motor	Vessels of not over 15 gross tons.	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	None	All vessels except those covered by Subchapter D.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage, except yachts, and all other vessels carrying passengers for hire except documented cargo vessels over 65 feet in length issued a permit to carry not more than 16 persons in addition to the crew.	All vessels carrying freight for hire except those covered by Subchapters D and H.	All vessels except those covered by Subchapters D, H, and I.
	Seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew.	All vessels except those covered by subchapter D and H, and those engaged in the fishing, oystering, clamming, crabbing, or any other branch of the fishery, kelp, or sponge industry.	All vessels except those covered by subchapter D, H, and I.
Sail	----------	All vessels carrying combustible or inflammable liquid cargo in bulk.	All vessels 700 gross tons and over, carrying passengers for hire.	None	None.
Non self-propelled	Seagoing barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges 100 gross tons and over carrying passengers.	All barges 100 gross tons and over except those covered by Subchapters D and H.	All barges carrying passengers except those covered by subchapter H.
	Inland barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges over 100 gross tons carrying passengers for hire.	None	All barges carrying passengers except those covered by subchapter H.

[1] Subchapter E (Load Lines), F (Marine Engineering), and J (Electrical Engineering) of this chapter are also applicable under certain conditions.

[2] Public nautical school ships other than vessels of the Navy and Coast Guard, shall meet the requirements of part 167 of subchapter R (Nautical Schools) of this chapter. Civilian nautical school ships, as defined by 46 U. S. C. 1331, shall meet the requirements of subchapter H (Passenger Vessels) and part 168 of subchapter R (Nautical Schools) of this chapter.

[3] Any vessel on an international voyage is subject to the applicable requirements of he International Convention for the Safety of Life at Sea, 1948.

[4] Length measured from end to end over deck, excluding sheer.

[5] Boilers and machinery are subject to examination.

[6] Vessels covered by subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter, where the principal purpose or use of the vessel is not for the carriage of liquid cargo, may be granted a permit to carry a limited amount of combustible liquid cargo in bulk. The portion of the vessel used for the carriage of the combustible liquid cargo shall meet the requirements of subchapter D (Tank Vessels) in addition to the requirements of subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter.

(2) Any vessel operating exclusively on inland waters which are not navigable waters of the United States.

(3) Any vessel while laid up and dismantled and out of commission.

(4) With the exception of vessels of the U. S. Maritime Administration, any vessel with title vested in the United States and which is used for public purposes.

§ 90.05-5 *Specific application noted in text.* (a) At the beginning of the various parts, subparts, and sections, a more specific application is generally given for the particular portion of the text involved. This application sets forth the types, sizes, or services or vessels to which the text pertains, and in many cases limits the application of the text to vessels contracted for before or after a specific date. As used in this subchapter, the term "vessels contracted for" includes not only the contracting for the construction of a vessel, but also the contracting for a material alteration to a vessel, the contracting for the conversion of a vessel to a cargo or miscellaneous vessel, and the changing of service or route of a vessel if such change increases or modifies the general requirements for the vessel or increases the hazards to which it might be subjected.

SUBPART 90.10—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

§ 90.10-1 *Approved.* This term means approved by the Commandant unless otherwise stated.

§ 90.10-3 *Carrying passengers for hire.* The carriage of any person or persons by a vessel for a valuable consideration, whether directly or indirectly flowing to the owner, charterer, operator, agent or any other person interested in the vessel.

§ 90.10-5 *Carrying freight for hire.* The carriage of any goods, wares, or merchandise or any other freight for a valuable consideration whether directly or indirectly flowing to the owner, charterer, operator, agent, or any other person interested in the vessel.

§ 90.10-7 *Commandant.* This term means the Commandant of the Coast Guard.

§ 90.10-9 *Coast Guard District Commander.* This term means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within his district, which include the inspection, enforcement, and administration of Title 52,

Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 90.10–11 *Coastwise.* Under this designation shall be included all vessels normally navigating the waters of any ocean or the Gulf of Mexico 20 nautical miles or less offshore.

§ 90.10–13 *Great Lakes.* Under this designation shall be included all vessels navigating the Great Lakes.

§ 90.10–15 *Headquarters.* This term means the Office of the Commandant, United States Coast Guard, Washington, D. C.

§ 90.10–17 *International voyage.* An international voyage as applied to United States vessels includes voyages between United States ports and ports outside the United States as well as between United States Continental ports and ports in the Territory of Alaska, Commonwealth of Puerto Rico, Territory of Hawaii, the Panama Canal Zone, or any other separate portion of the United States constituting a possession or held under a protectorate or mandate. However, vessels solely navigating the Great Lakes and their connecting and tributary waters as far east as the exit of the Lachine Canal at Montreal, in the province of Quebec, Canada, shall not be considered as on an international voyage for the purpose of the regulations contained in this subchapter.

§ 90.10–19 *Lakes, bays, and sounds.* Under this designation shall be included all vesels navigating the waters of any of the lakes, bays, or sounds other than the waters of the Great Lakes.

§ 90.10–21 *Marine inspector or inspector.* These terms mean any person from the civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspection, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 90.10–23 *Motorboat.* This term means any vessel indicated in Column 5 of Table 90.05–1 (a) 65 feet in length or less which is propelled by machinery (including steam). The length shall be measured from end to end over the deck excluding sheer. This term includes a boat temporarily or permanently equipped with a detachable motor and any such boat when so propelled is subject to the applicable provisions of the Motorboat Act of April 25, 1940, as amended (secs. 1 to 21, 54 Stat. 163–167, 46 U. S. C. 526–526t), and the regulations promulgated thereunder. For the purpose of this subchapter, motorboats are included under the term "vessel" unless specifically noted otherwise. The various classes of motorboats are as follows:

Class A—Any motorboat less than 16 feet in length.
Class 1—Any motorboat 16 feet or over and less than 26 feet in length.
Class 2—Any motorboat 26 feet or over and less than 40 feet in length.
Class 3—Any motorboat 40 feet or over and not more than 65 feet in length.

§ 90.10–25 *Ocean.* Under this designation shall be included all vessels navigating the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore.

§ 90.10–27 *Officer in charge, marine inspection.* This term means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who, under the superintendence and direction of the Coast Guard District Commander, is in charge of an inspection zone for the performance of duties with respect to the inspections, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 90.10–29 *Passenger.* A passenger is every person other than the master and the members of the crew or other persons employed or engaged in any capacity on board a vessel in the business of that vessel. In the case of a vessel on an international voyage a child under 1 year of age is not counted as a passenger.

§ 90.10–31 *Pilot rules.* (a) The term "pilot rules" means the statutory rules of the road and the implementing regulations of the Commandant. The regulatory pilot rules are contained in 33 CFR Parts 80, 82, 84, 90, 92, 95, and 100.

(b) In accordance with law, the Coast Guard publishes the statutory rules of the road and regulatory pilot rules in pamphlet form as follows:

(1) Rules to Prevent Collisions of Vessels and Pilot Rules for Certain Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico (CG 169).

(2) Pilot Rules for the Great Lakes and Their Connecting and Tributary Waters and the St. Marys River (CG 172).

(3) Pilot Rules for the Western Rivers and the Red River of the North (CG 184).

§ 90.10–33 *Rivers.* Under this designation shall be included all vessels whose navigation is restricted to rivers and/or canals, exclusively and to such other waters as may be so designated by the Coast Guard District Commander.

§ 90.10–35 *Recognized classification society.* The term "recognized classification society" means the American Bureau of Shipping or other classification society recognized by the Commandant.

§ 90.10–37 *Vessel.* Where the word "vessel" is used in this subchapter, it shall be considered to include all vessels indicated in Column 5 of Table 90.05–1 (a), except as otherwise noted in this subpart.

§ 90.10–39 *Western rivers.* For the purpose of this subchapter, the term "western rivers" is as defined in CG 184, Pilot Rules for the Western Rivers and the Red River of the North.

SUBPART 90.15—EQUIVALENTS

§ 90.15–1 *Conditions under which equivalents may be used.* (a) Where in this subchapter it is provided that a particular fitting, appliance, apparatus, or equipment, or type thereof, shall be fitted or carried in a vessel, or that any particular arrangement shall be adopted, the Commandant may accept in substitution therefor any other fitting, apparatus, or equipment, or type thereof, or any other arrangement: *Provided,* That he shall have been satisfied by suitable trials that the fitting, appliance, apparatus, or equipment, or type thereof, or the arrangement is at least as effective as that specified in this subchapter.

(b) In any case where is is shown to the satisfaction of the Commandant that the use of any particular equipment, apparatus, or arrangement not specifically required by law is unreasonable or impracticable, the Commandant may permit the use of alternate equipment, apparatus, or arrangement to such an extent and upon such conditions as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subchapter.

SUBPART 90.20—GENERAL MARINE ENGINEERING REQUIREMENTS

§ 90.20–1 *Marine engineering details.* (a) All marine engineering details such as piping, valves, fittings, boilers, pressure vessels, etc., and their appurtenances installed on the vessel, shall be designed, constructed, and installed in accordance with the provisions of Subchapter F (Marine Engineering) of this chapter.

SUBPART 90.25—GENERAL ELECTRICAL ENGINEERING REQUIREMENTS

§ 90.25–1 *Electrical engineering details.* (a) All electrical engineering details and installations shall be designed and installed in accordance with Subchapter J (Electrical Engineering) of this chapter.

SUBPART 90.30—SPECIAL PROVISIONS

§ 90.30–1 *Vessels acquired or documented under the act of June 6, 1941.* (a) Vessels acquired or documented under the Act of June 6, 1941, as amended (sec. 5, 55 Stat. 244, 245; 50 U. S. C. App. 1275), shall be subject to the applicable provisions of Title 52 of the Revised Statutes, acts amendatory thereof or supplemental thereto and the rules and regulations thereunder.

(b) Unapproved lifesaving, fire fighting, and other equipment may be continued in service as long as, in the opinion of the Officer in Charge, Marine Inspection, such equipment is in good and serviceable condition. All replacements shall be in accordance with Coast Guard requirements.

§ 90.30–5 *Installations of equipment made during the unlimited national emergency declared by the President on May 27, 1941.* (a) Boilers, pressure vessels, machinery, piping, electrical, and other installations, including lifesaving, fire fighting, and other safety equipment, installed on vessels during the Unlimited National Emergency declared by the President on May 27, 1941, and prior to

the termination of Title V of the Second War Powers Act, as extended (sec. 501, 56 Stat. 180, 50 App. Sup. 635), which do not fully meet the detailed requirements of the regulations in this chapter, may be continued in service if found to be satisfactory by the Commandant for the purpose intended.

SUBPART 90.35—AMERICAN BUREAU OF SHIPPING'S STANDARDS

§ 90.35–1 *Standards to be used.* (a) Where in this subchapter an item, or method of construction, or testing is required to meet the standards established by the American Bureau of Shipping, the current standards in effect at the time of construction of the vessel, or otherwise as applicable, shall be used. The current standards of other recognized classification societies may also be accepted upon approval by the Commandant.

§ 90.35–5 *Where obtainable.* (a) The standards established by the American Bureau of Shipping are usually published annually and may be purchased from the American Bureau of Shipping, 45 Broad Street, New York 4, New York. These standards may be also examined at the Office of the Commandant (M), U. S. Coast Guard, Washington, D. C., or at the Office of any Coast Guard District Commander or Officer in Charge, Marine Inspection.

PART 91—INSPECTION AND CERTIFICATION

Chapter I is amended by adding a new Part 91 to Subchapter I reading as follows:

SUBPART 91.01—CERTIFICATE OF INSPECTION

Sec.
91.01–1 When required.
91.01–5 Posting.
91.01–10 Period of validity.
91.01–15 Temporary certificate.
91.01–20 Expired certificate.

SUBPART 91.05—PERMIT TO PROCEED TO ANOTHER PORT FOR REPAIR

91.05–1 When issued.
91.05–5 To whom issued.
91.05–10 Conditions of permit.
91.05–15 Posting.

SUBPART 91.15—INSPECTION OF VESSELS

91.15–1 Standard in inspection of hulls, boilers, and machinery.

SUBPART 91.20—INITIAL INSPECTION

91.20–1 Prerequisite of certificate of inspection.
91.20–5 When made.
91.20–10 Plans.
91.20–15 Scope of inspection.
91.20–20 Specific tests and inspections.

SUBPART 91.25—ANNUAL INSPECTION

91.25–1 Prerequisite of reissuance of certificate of inspection.
91.25–5 When made.
91.25–10 Scope of inspection.
91.25–15 Lifesaving equipment.
91.25–20 Fire extinguishing equipment.
91.25–25 Hull equipment.
91.25–30 Electrical engineering equipment.
91.25–35 Marine engineering equipment.
91.25–40 Sanitary inspection.
91.25–50 Fire hazards.
91.25–55 Inspector not limited.

SUBPART 91.30—INSPECTION AFTER ACCIDENT

Sec.
91.30–1 General or partial survey.

SUBPART 91.35—SANITARY INSPECTIONS

91.35–1 When made.

SUBPART 91.40—DRY DOCKING

91.40–1 When dry docked.
91.40–5 Notice by owner.

SUBPART 91.45—REPAIRS AND ALTERATIONS

91.45–1 Notice required.
91.45–5 Inspection required.

SUBPART 91.50—GAS FREEING

91.50–1 Inspection necessary.

SUBPART 91.55—PLAN APPROVAL

91.55–1 General.
91.55–5 Plans and specifications required for new construction.
91.55–10 Plans required for alterations of existing vessels.
91.55–15 Procedure for submittal of plans.
91.55–20 Number of plans required.

SUBPART 91.60—SAFETY EQUIPMENT CERTIFICATE

91.60–1 Required on an international voyage.

AUTHORITY: §§ 91.01–1 to 91.60–1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4423, 4426–4431, 4433, 4434, 4453, as amended, sec. 14, 29 Stat. 690, secs. 10, 11, 35 Stat. 428. 41 Stat. 305, 49 Stat. 1544, 1935, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 392, 399, 400, 404–409, 411, 412, 435, 366, 395, 396, 363, 367, 660a, 50 U. S. C. App. 1275.

SUBPART 91.01—CERTIFICATE OF INSPECTION

§ 91.01–1 *When required.* (a) Except as noted in this subpart of Subpart 91.05, no vessel subject to inspection and certification shall be operated without a valid certificate of inspection.

§ 91.01–5 *Posting.* (a) On vessels of over 25 gross tons, the original certificate of inspection shall, in general, be framed under glass and posted in a conspicuous place where it will be most likely to be observed. On vessels not over 25 gross tons, and on other vessels such as barges, where the framing of the certificate under glass would be impracticable, the original certificate of inspection shall be kept on board to be shown on demand.

§ 91.01–10 *Period of validity.* (a) Certificates of inspection will be issued for a period of one year. However, application may be made by the owner for inspection and issuance of a new certificate of inspection at any time within that year. The certificate of inspection may be revoked or suspended at any time.

§ 91.01–15 *Temporary certificate.* (a) If necessary to prevent delay of the vessel, a temporary certificate of inspection, Form CG 854, shall be issued pending the issuance and delivery of the regular certificate of inspection. Such temporary certificate shall be carried in the same manner as the regular certificate and shall in all ways be considered the same as the regular certificate of inspection which it represents.

§ 91.01–20 *Expired certificate.* (a) Nothing in this subpart shall prevent a vessel upon a regularly established line from a port in the United States to a port of a foreign country not contiguous to the United States whose certificate of inspection expires at sea or while said vessel is in a foreign port or a port of Hawaii from lawfully completing her voyage without the valid certificate of inspection or temporary certificate required by this subpart: *Provided,* That the certificate of inspection did not expire within 15 days after the vessel left the last port of the United States, and that the voyage shall be completed within 30 days after the expiration of the certificate of inspection.

SUBPART 91.05—PERMIT TO PROCEED TO ANOTHER PORT FOR REPAIR

§ 91.05–1 *When issued.* (a) The Officer in Charge, Marine Inspection, may issue a permit to proceed to another port for repair, Form CG 948 to a vessel, if in his judgment it can be done with safety, even if the certificate of inspection of the vessel has expired or is about to expire.

§ 91.05–5 *To whom issued.* (a) Such permit will only be issued upon the written application of the master, owner, or agent of the vessel.

§ 91.05–10 *Conditions of permit.* (a) The permit will state upon its face the conditions under which it is issued and whether or not the vessel is permitted to carry freight or passengers. Passengers may not be carried if the certificate of inspection has expired, except as provided under § 91.01–20.

§ 91.05–15 *Posting.* (a) The permit shall be carried in a manner similar to that described in § 91.01–5 for a certificate of inspection.

SUBPART 91.15—INSPECTION OF VESSELS

§ 91.15–1 *Standard in inspection of hulls, boilers, and machinery.* (a) In the inspection of hulls, boilers, and machinery of vessels, the standards established by the American Bureau of Shipping, see Subpart 90.35 of this subchapter, respecting material and construction of hulls, boilers, and machinery, and the certificate of classification referring thereto, except where otherwise provided for by the rules and regulations in this subchapter, Subchapter E (Load Lines), Subchapter F (Marine Engineering), or Subchapter J (Electrical Engineering) of this chapter shall be accepted as standard by the inspectors.

SUBPART 91.20—INITIAL INSPECTION

§ 91.20–1 *Prerequisite of certificate of inspection.* (a) The initial inspection is a prerequisite of the issuance of the original certificate of inspection.

§ 91.20–5 *When made.* (a) The original inspection will only be made upon the written application of the owner or builder of the vessel to the Officer in Charge, Marine Inspection, on Form CG

833, at or nearest the port where the vessel is located.

§ 91.20–10 *Plans.* (a) Before application for inspection is made, and before construction is started, the owner or builder shall have plans approved by the Commandant indicating the proposed arrangement and construction of the vessel. The procedure for submitting plans and the list of plans to be supplied is set forth in Subpart 91.55.

§ 91.20–15 *Scope of inspection.* (a) The initial inspection, which may consist of a series of inspections during the construction of a vessel, shall include a complete inspection of the structure, machinery, and equipment, including the outside of the vessel's bottom and the outside and where possible the inside of the boilers. The inspection shall be such as to insure that the arrangements, materials, and scantlings of the structure, boilers and their appurtenances, piping, main and auxiliary machinery, electrical installations, life saving appliances, fire detecting and extinguishing equipment, and other equipment fully comply with the applicable regulations for such vessel and are in accordance with approved plans, and that the radio installation is in accordance with the requirements of the Federal Communications Commission. The inspection shall also be such as to insure that the workmanship of all parts of the vessel and its equipment is in all respects satisfactory. If equipment is installed which is not required, such as fire detecting systems, etc., such equipment shall be inspected and tested as required by Subpart 71.20 of Subchapter H (Passenger Vessels) of this chapter.

§ 91.20–20 *Specific tests and inspections.* (a) The applicable tests and inspections relating to annual inspection as set forth in Subpart 91.25 shall be made at this time. In addition, the following specific tests and inspections shall be made by the inspector.

(1) Installation of lifeboats, davits, and winches—see Subpart 94.35 of this subchapter.

(2) Installation of carbon dioxide extinguishing piping—see §95.15–35.

(3) For inspection procedures of marine engineering equipment and systems, see Subchapter F (Marine Engineering) of this chapter.

(4) For inspection procedures of Electrical Engineering equipment and systems, see Subchapter J (Electrical Engineering) of this chapter.

SUBPART 91.25—ANNUAL INSPECTION

§ 91.25–1 *Prerequisite of reissuance of certificate of inspection.* (a) The annual inspection is a prerequisite of the reissuance of a certificate of inspection.

§ 91.25–5 *When made.* (a) The annual inspection will only be made upon the written application of the master, owner, or agent of the vessel on Form CG 833 to the Officer in Charge, Marine Inspection, at or nearest the port where the vessel is located.

§ 91.25–10 *Scope of inspection.* (a) The annual inspection shall include an inspection of the structure, boilers, machinery and equipment. The inspection shall be such as to insure that the vessel, as regards the structure, boilers and their appurtenances, piping main and auxiliary machinery, electrical installations, lifesaving appliances, fire detecting and extinguishing equipment, and other equipment, is in satisfactory condition and fit for the service for which it is intended, and that it complies with the applicable regulations for such vessel, and that the radio installation is in compliance with the requirements of the Federal Communications Commission. If equipment is installed that is not required, such as fire detecting system in lifeboats, etc., such equipment shall be inspected and tested as required by Subpart 71.25 of Subchapter H (Passenger Vessels) of this chapter.

§ 91.25–15 *Lifesaving equipment.* (a) At each annual inspection, the inspector shall conduct the following tests and inspections of lifesaving equipment.

(1) It shall be demonstrated that the air tanks of all lifesaving appliances are airtight.

(2) If practicable, each lifeboat shall be lowered to near the water and then be loaded with its allowed capacity, evenly distributed throughout the length, and then be lowered into the water until it is afloat, and be released from the falls. In making this test, persons or deadweight may be used. The total weight used shall be at least equal to the allowed capacity of the lifeboat considering persons to weigh 165 pounds each.

(3) Each life preserver shall be examined to determine its serviceability. If found to be satisfactory, it will be stamped "Passed," together with the date, the port, and the inspector's initials. If not in a serviceable condition, the life preserver shall be removed from the vessel's equipment, and if beyond repair, shall be destroyed in the presence of the inspector.

(4) All lifeboat winch electrical control apparatus shall be opened up and inspected.

(5) Where gravity davits are installed, it shall be demonstrated that the lifeboat can be swung out and lowered from any stopped position by merely releasing the brake on the lifeboat winch. The use of force to start the davits or the lifeboat winch will not be permitted.

(6) All other items of lifesaving equipment shall be examined to determine that they are in suitable condition.

§ 91.25–20 *Fire extinguishing equipment.* (a) At each annual inspection, the inspector shall conduct the following tests and inspections of fire extinguishing equipment:

(1) All hand portable fire extinguishers and semi-portable fire extinguishing systems shall be checked as noted in Table 91.25–20 (a) (1). In addition, the hand portable fire extinguishers and semi-portable fire extinguishing systems shall be examined for excessive corrosion and general condition.

TABLE 91.25–20 (a) (1)

Type unit	Test
Soda acid	Discharge. Clean inside and hose thoroughly. Recharge.
Foam	Discharge. Clean inside and hose thoroughly. Recharge.
Pump tank (water or antifreeze).	Discharge. Clean inside and hose thoroughly. Recharge with clean water or new antifreeze.
Cartridge operated (water antifreeze or loaded stream).	If pressure cartridge is punctured, or if it weighs ½ ounce less than amount stamped on cartridge, it shall be replaced. Remove liquid. Clean inside and hose thoroughly. Recharge with clean water or new solution or antifreeze. Insert charged cartridge.
Carbon tetrachloride.	Discharge a few strokes into a clean container. Recharge with new or discharged liquid. Keep water out of extinguisher. Ascertain that it is completely full of liquid.
Carbon dioxide.	Weigh cylinders. Recharge if weight loss exceeds 10 percent of weight of charge. Inspect hose and nozzle to be sure they are clear.
Dry chemical.	If pressure cartridge is punctured, or if it weighs ½ ounce less than amount stamped on cartridge, it shall be replaced. Inspect hose and nozzle to be sure they are clear. Insert charged cartridge. Ascertain that chamber contains full charge and that powder is not caked.

(2) Fixed fire extinguishing systems shall be checked as noted in Table 91.25–20 (a) (2). In addition, all parts of the fixed fire extinguishing systems shall be examined for excessive corrosion and general conditions.

TABLE 91.25–20 (a) (2)

Type system	Test
Foam	Systems utilizing a soda solution shall have such solution replaced. In all cases, ascertain that powder is not caked.
Carbon dioxide.	Weigh cylinders. Recharge if weight loss exceeds 10 percent of weight of charge.

(3) On all fire extinguishing systems, all piping controls, valves, and alarms shall be checked to ascertain that the system is in operating condition. In this respect, steam smothering lines shall be checked with at least a 50 p. s. i. air pressure with the ends capped or by blowing steam through the lines at the designed pressure.

(4) The fire main system shall be operated and the pressure checked at the most remote and highest outlets. All fire hose shall be subjected to a test pressure equivalent to the maximum pressure to which they may be subjected in service, but not less than 100 p. s. i.

§ 91.25–25 *Hull equipment.* (a) At each annual inspection, the inspector shall conduct the following tests and inspections of hull equipment:

(1) All watertight doors shall be operated locally by manual power and also by hydraulic or electric power if so fitted. Where remote control is fitted, the doors shall also be operated by the remote control apparatus.

(2) The remote controls of all valves shall be operated.

§ 91.25–30 *Electrical engineering equipment.* (a) For inspection procedures of electrical engineering equipment and systems see Subchapter J (Electrical Engineering) of this chapter.

§ 91.25–35 *Marine engineering equipment.* (a) For inspection procedures of marine engineering equipment and systems, see Subchapter F (Marine Engineering) of this chapter.

§ 91.25–40 *Sanitary inspection.* (a) At each annual inspection the quarters, toilet and washing spaces, galleys, serving pantries, lockers, etc., shall be examined by the inspector to be assured that they are in a sanitary condition.

§ 91.25–45 *Fire hazards.* (a) At each annual inspection, the inspector shall examine the tank tops and bilges in the machinery spaces to see that there is no accumulation of oil which might create a fire hazard.

§ 91.25–50 *Inspector not limited.* (a) Nothing in this subpart shall be construed as limiting the inspector from making such tests or inspections as he deems necessary to be assured of the safety and seaworthiness of the vessel.

SUBPART 91.30—INSPECTION AFTER ACCIDENT

§ 91.30–1 *General or partial survey.* (a) A survey, either general or partial, according to the circumstances, shall be made every time an accident occurs or a defect is discovered which affects the safety of the vessel or the efficacy or completeness of its lifesaving appliances, fire-fighting or other equipment, or whenever any important repairs or renewals are made. The survey shall be such as to insure that the necessary repairs or renewals have been effectively made, that the material and the workmanship of such repairs or renewals are in all respects satisfactory, and that the vessel complies in all respects with the regulations in this subchapter.

SUBPART 91.35—SANITARY INSPECTIONS

§ 91.35–1 *When made.* (a) An inspection of quarters, toilet and washing spaces, serving pantries, galleys, etc., shall be made at least once in every month. If the route of the vessel is such that it is away from a United States port for more than one month, an inspection shall be conducted at least once every trip.

SUBPART 91.40—DRY DOCKING

§ 91.40–1 *When dry docked.* (a) All vessels shall be placed in dry dock or hauled out for examination within the periods set forth in this paragraph depending upon the service.

(1) Vessels whose operations in salt water service aggregate more than 6 months in a calendar year—once in each year.

(2) Vessels whose operations in salt water service aggregate 6 months or less in a calendar year—once in each 2 years.

(3) Vessels whose operations are confined exclusively to fresh water—once in each 5 years.

§ 91.40–5 *Notice by owner.* (a) The master, owner, or agent shall notify the Officer in Charge, Marine Inspection, when any vessel is to be placed on a dry dock in order that an examination of the underwater portion of the vessel may be made if deemed necessary.

SUBPART 91.45—REPAIRS AND ALTERATIONS

§ 91.45–1 *Notice required.* (a) No repairs or alterations affecting the safety of the vessel with regard to the hull, machinery, or equipment, shall be made without the knowledge of the Officer in Charge, Marine Inspection.

(b) Drawings of alterations shall be approved before work is started unless deemed unnecessary by the Officer in Charge, Marine Inspection.

(c) Drawings will not be required for repairs in kind.

§ 91.45–5 *Inspection required.* (a) An inspection either general or partial depending upon the circumstances shall be made whenever any important repairs or alterations are undertaken.

SUBPART 91.50—GAS FREEING

§ 91.50–1 *Inspection necessary.* (a) No alterations, repairs, or operations involving riveting, welding, burning, etc., shall be made in or on the boundaries of oil tanks, oil lines, or oil heating coils until an inspection has been made to determine that such operation can be undertaken with safety. Such inspection shall be made and evidenced as follows:

(1) In a port of the United States, the inspection shall be made by a gas chemist certified by the American Bureau of Shipping. If the services of such certified chemist are not available, the Officer in Charge, Marine Inspection, may, upon the recommendation of the vessel's owner, or contractor, select a competent person to make the inspection. If the inspection reveals that the work may be undertaken with safety, the chemist or authorized person shall issue a certificate setting forth such facts, with any qualifications, before the work is started.

(2) When not in a port of the United States, and a gas chemist is not available, the inspection shall be made by the senior officer present and a proper entry shall be made in the log.

SUBPART 91.55—PLAN APPROVAL

§ 91.55–1 *General.* (a) The following list of required plans is general in character, but includes all plans which normally show construction and safety features coming under the cognizance of the Coast Guard. In the case of a particular vessel, all of the plans enumerated may not be applicable, and it is intended that only those plans and specifications be submitted as will clearly show the vessel's arrangement, construction and required equipment.

(b) In the following list of required plans, the items which must be approved by the American Bureau of Shipping for vessels classed by that organization are indicated by an asterisk. When prints bearing record of such approval by the American Bureau of Shipping are forwarded to the Coast Guard they will in general be accepted as satisfactory except insofar as the law or the Coast Guard regulations contain requirements which are not covered by the American Bureau of Shipping.

§ 91.55–5 *Plans and specifications required for new construction*—(a) *General.* (1) Specifications.

(2) General Arrangement Plan of decks, holds, inner bottoms, etc., and including inboard and outboard profile.

(b) *Hull structure.*[1] (1) *Inner Bottom Plating and Framing.

(2) *Midship Section.

(3) *Shell Plating and Framing.

(4) *Stem, Stern Frame, and Rudder.

(5) *Structural Deck Plans for Strength Decks.

(6) *Pillars and Girders.

(7) *Watertight and Oiltight Bulkheads.

(8) *Foundations for Main Machinery and Boilers.

(9) *Arrangement of Ports, Doors, and Airports in Shell Plating.

(10) *Hatch Coamings and Covers in Weather and Watertight Decks.

(11) *Details of Watertight Doors and Operating Gear.

(12) *Scuppers and Drains Penetrating Shell Plating.

(c) *Hull calculations, etc.* Required only when a stability test is to be performed.

(1) Lines (for information).

(2) Curves of Form.

(3) Capacity Plan showing capacities and vertical and longitudinal centers of gravity of cargo spaces, tanks, etc. (for information).

(4) Tank Sounding tables (for information).

(5) Draft Mark Locations (for information).

(d) *Fire control.* (1) Alarm systems.

(2) Extinguishing systems, including fire mains, carbon dioxide, steam, and sprinkling systems.

(e) *Marine engineering.* For plans required for marine engineering equipment and systems, see Subchapter F (Marine Engineering) of this chapter.

(f) *Electrical engineering.* For plans required for electrical engineering, equipment and systems, see Subchapter J (Electrical Engineering) of this chapter.

(g) *Lifesaving equipment.* (1) These plans are to show the location and arrangement of embarkation decks, all overboard discharges and projections in way of launching lifeboats, weights of lifeboats fully equipped and loaded, working loads of davits and winches, types and sizes of falls, the manufacturer's name and identification for all equipment, and all other relevant and necessary information.

(i) Arrangement of lifeboats.

(ii) Arrangement of davits.

(iii) Location and stowage of life rafts and buoyant apparatus.

(h) *Crew's accommodations.* (1) Arrangement plans showing accommodations, ventilation, escapes, hospital, and sanitary facilities for all crew members.

§ 91.55–10 *Plans required for alterations of existing vessels.* (a) In the event of alterations involving the safety of the vessel, the applicable plans shall be submitted for approval covering the proposed work except as modified by

[1] The asterisk (*) indicates items which may require approval by the American Bureau of Shipping for vessels classed by that society.

§ 91.45–1. The general scope of the plans shall be as noted in § 91.55–5.

§ 91.55–15 *Procedure for submittal of plans.* (a) As the relative location of shipyards, design offices, and Coast Guard offices vary throughout the country, no specific routing will be required in the submittal of plans. In general, one of the following procedures would apply, but in a particular case, if a more expeditious procedure can be used, there will be no objection to its adoption.

(1) The plans may be submitted to the Officer in Charge, Marine Inspection, in the district in which the vessel is to be built. This procedure will be most expeditious in the case of those offices where personnel and facilities are available for examination and approval of the plans locally.

(2) The plans may be submitted directly to the Commandant (MMT), U. S. Coast Guard, 1300 "E" Street NW., Washington 25, D. C. In this case, the plans will be returned directly to the submitter, with a copy of the action being forwarded to the interested Officer in Charge, Marine Inspection.

(3) In the case of classed vessels, upon specific request by the submitter, the American Bureau of Shipping will arrange to forward the necessary plans to the Coast Guard indicating its action thereon. In this case, the plans will be returned as noted in subparagraph (2) of this paragraph.

§ 91.55–20 *Number of plans required.* (a) Three copies of each plan are normally required so that one can be returned to the submitter and one copy each can be retained by Coast Guard Headquarters and the Officer in Charge, Marine Inspection. If the submitter desires additional approved plans, a suitable number should be submitted to permit the desired distribution.

SUBPART 91.60—SAFETY EQUIPMENT CERTIFICATE

§ 91.60–1 *Required on an international voyage.* (a) All vessels on an international voyage, and meeting the requirements of this subchapter, shall be issued and keep posted a safety equipment certificate, and where applicable, a safety radio-telegraphy certificate, a safety radio-telephony certificate, and/or an exemption certificate, in accordance with the requirements of the International Convention for the Safety of Life at Sea, 1948, Chapter I, Regulations 11 through 19.

Chapter I is amended by adding a new Part 92 to Subchapter I reading as follows:

PART 92—CONSTRUCTION AND ARRANGEMENT

SUBPART 92.01—HULL STRUCTURE

Sec.

92.01–1 Application.
92.01–5 Vessels subject to load line.
92.01–10 Structural standards.
92.01–15 Special consideration.
92.01–90 Vessels contracted for prior to November 19, 1952.

SUBPART 92.05—STRUCTURAL FIRE PROTECTION

Sec.

92.05–1 Fire hazards to be minimized.
92.05–5 Woodwork insulated for heated surfaces.
92.05–10 Lamp room construction.

SUBPART 92.10—MEANS OF ESCAPE

92.10–1 Application.
92.10–5 Two means required.
92.10–10 Location.
92.10–15 Vertical ladders not accepted.
92.10–20 No means for locking doors.
92.10–25 Stairway size.
92.10–30 Dead end corridors.
92.10–35 Public spaces.
92.10–40 Access to lifeboats.
92.10–45 Weather deck communications.
92.10–90 Vessels contracted for prior to November 19, 1952.

SUBPART 92.15—VENTILATION

92.15–1 Application.
92.15–5 Vessels using fuel having a flash point of 110 degrees or lower.
92.15–10 Ventilation for closed spaces.
92.15–15 Ventilation for crew quarters and where provided, passenger spaces.
92.15–90 Vessels contracted for prior to November, 1952.

SUBPART 92.20—ACCOMMODATIONS FOR OFFICERS AND CREW

92.20–1 Application.
92.20–5 Intent.
92.20–10 Location of crew spaces.
92.20–15 Construction.
92.20–20 Sleeping accommodations.
92.20–25 Washrooms and toilet rooms.
92.20–30 Mess rooms.
92.20–35 Hospital space.
92.20–40 Other spaces.
92.20–45 Lighting.
92.20–50 Heating.
92.20–55 Insect screens.
92.20–90 Vessels contracted for prior to November 19, 1952.

SUBPART 92.25—RAILS AND GUARDS

92.25–1 Application.
92.25–5 Where rails required.
92.25–10 Storm rails.
92.25–15 Guards in dangerous places.
92.25–90 Vessels contracted for prior to November 19, 1952.

AUTHORITY: §§ 92.01–1 to 92.25–90 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4490, as amended, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 482, 483, 363, 367, 463a, 50 U. S. C. App. 1275.

SUBPART 92.01—HULL STRUCTURE

§ 92.01–1 *Application.* (a) The provisions of this subpart, with the exception of § 92.01–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 92.01–90.

§ 92.01–5 *Vessels subject to loadline.* (a) For vessels assigned a load line, see Subchapter E (Load Lines) of this chapter, or special requirements as to strength, closure of openings, etc.

§ 92.01–10 *Structural standards.* (a) In general, compliance with the standards established by the American Bureau of Shipping, see Subpart 90.35 of this subchapter, will be considered as satisfactory evidence of the structural efficiency of the vessel. However, in special cases, a detailed analysis of the entire structure or some integral part may be made by the Coast Guard to determine the structural requirements.

§ 92.01–15 *Special consideration.* (a) Special consideration will be given to the structural requirements for small vessels or vessels of an unusual design not contemplated by the rules of the American Bureau of Shipping.

§ 92.01–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing structure previously approved will be considered satisfactory so long as it is maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

SUBPART 92.05—STRUCTURAL FIRE PROTECTION

§ 92.05–1 *Fire hazards to be minimized.* (a) The general construction of the vessel shall be such as to minimize fire hazards insofar as is reasonable and practicable.

§ 92.05–5 *Woodwork insulated for heated surfaces.* (a) Internal combustion engine exhausts, boiler and galley uptakes, and similar sources of ignition shall be kept clear of and suitably insulated from any woodwork or other combustible matter.

§ 92.05–10 *Lamp room construction.* (a) Lamp, paint, and oil lockers and similar compartments shall be constructed of steel or shall be wholly lined with metal.

SUBPART 92.10—MEANS OF ESCAPE

§ 92.10–1 *Application.* (a) The provisions of this subpart, with the exception of § 92.10–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 92.10–90.

§ 92.10–5 *Two means required.* (a) There shall be at least two means of escape from all general areas accessible to the passengers, if carried, or where the crew may be quartered or normally employed. At least one of these two means of escape shall be independent of watertight doors.

§ 92.10–10 *Location.* (a) The two means of escape shall be as remote as practicable so as to minimize the possibility of one incident blocking both escapes.

§ 92.10–15 *Vertical ladders not accepted.* (a) Vertical ladders and deck scuttles shall not in general be considered satisfactory as one of the required means of escape. However, where it is demonstrated that the installation of a stairway would be impracticable, a vertical ladder may be used as the second means of escape.

§ 92.10–20 *No means for locking doors.* (a) No means shall be provided for locking doors giving access to either of the two required means of escape, except that crash doors or locking devices, capable of being easily forced in an emergency, may be employed provided a permanent and conspicuous notice to this effect is attached to both sides of the

door. This paragraph shall not apply to outside doors to deck houses where such doors are locked by key only and such key is under the control of one of the vessel's officers.

§ 92.10–25 *Stairway size.* (a) Stairways shall be of sufficient width having in mind the number of persons having access to such stairs for escape purposes.

§ 92.10–30 *Dead end corridors.* (a) Dead end corridors, or the equivalent, more than 40 feet in length shall not be permitted.

§ 92.10–35 *Public spaces.* (a) In all cases, public spaces having a deck area of over 300 square feet shall have at least two exits. Where practicable, these exits shall give egress to different corridors, rooms, or spaces to minimize the possibility of one incident blocking both exits.

§ 92.10–40 *Access to lifeboats.* (a) The stairways, corridors, and doors shall be so arranged as to permit a ready and direct access to the various lifeboat embarkation areas.

§ 92.10–45 *Weather deck communications.* (a) Vertical communication shall be provided between the various weather decks by means of permanent inclined ladders.

§ 92.10–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing arrangements previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original design provided that in no case will a greater departure from the standards of §§ 92.10–5 through 92.10–45 be permitted than presently exists. Nothing in this paragraph shall be construed as exempting any vessel from having 2 means of escape from all main compartments which are accessible to the passengers, if carried, or where the crew are normally quartered or employed.

SUBPART 92.15—VENTILATION

§ 92.15–1 *Application.* The provisions of this subpart, with the exception of § 92.15–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 92.15–90.

§ 92.15–5 *Vessels using fuel having a flash point of 110 degrees or lower.* (a) Where liquid fuel having a flash point of 110 degrees F. or lower is used for main or auxiliary machinery or for starting purposes, the spaces containing such machinery or fuel tanks shall have ventilation as required by this section.

(1) At least 2 ventilators fitted with cowls or their equivalent for the purpose of properly and effectively ventilating the bilges of every engine and fuel-tank compartment in order to remove any inflammable or explosive gases.

(2) Vessels constructed so that the greater portions of the bilges under the engine and fuel tanks are open or exposed to the natural atmosphere at all times are not required to be fitted with ventilators.

§ 92.15–10 *Ventilation for closed spaces.* (a) All enclosed spaces within the vessel shall be properly vented or ventilated. Means shall be provided to close off all vents and ventilators.

§ 92.15–15 *Ventilation for crew quarters and, where provided, passenger spaces.* (a) All living spaces shall be adequately ventilated in a manner suitable to the purpose of the space.

(b) On vessels of 100 gross tons and over, except for such spaces as are so located that under all ordinary conditions of weather, windows, ports, skylights, etc., and doors to passageways can be kept open, all crew spaces shall be ventilated by a mechanical system, unless it can be shown that a natural system will provide adequate ventilation. However, vessels which trade regularly in the tropics shall, in general, be fitted with a mechanical ventilation system.

§ 92.15–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing arrangements previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original design provided that in no case will a greater departure from the standards of §§ 92.15–5 through 92.15–15 be permitted than presently exists.

SUBPART 92.20—ACCOMMODATIONS FOR OFFICERS AND CREW

§ 92.20–1 *Application.* (a) The provisions of this subpart, with the exception of § 92.20–90, shall apply to all vessels of 100 gross tons and over contracted for on or after November 19, 1952. Vessels of 100 gross tons and over contracted for prior to November 19, 1952, shall meet the requirements of § 92.20–90.

(b) Vessels of less than 100 gross tons shall meet the applicable requirements of this subpart insofar as is reasonable and practicable.

§ 92.20–5 *Intent.* (a) It is the intent of this subpart that the accommodations provided for officers and crew on all vessels shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, arranged, and, where practicable, shall be insulated from undue noise and effluvia.

(b) The crew referred to herein includes all persons, except the licensed officers, regularly employed on board any vessel. Where the requirements for the accommodation of licensed officers are not otherwise specified, they shall be of at least equivalent to that indicated herein for the crew.

(c) For the purpose of this subpart, the term "crew spaces" shall include sleeping rooms, mess rooms, recreational rooms, toilet and shower spaces, etc., which are intended for the exclusive use of the crew.

§ 92.20–10 *Location of crew spaces.* (a) Crew spaces shall be located, where practicable, so that the maximum amount of fresh air and light are obtainable, having due regard to the service of the vessel and the requirements of other space users.

(b) Crew spaces shall not be located forward of the collision bulkhead, nor shall any section of the deck of such crew spaces be below the deepest load line, except that in special cases the Commandant may approve such an arrangement provided that in no case shall the deck head of the crew space be below the deepest load line.

(c) Hawse pipes or chain pipes shall not pass through crew spaces.

(d) There shall be no direct communication, except through solid, close fitted doors or hatches between crew spaces and chain lockers, cargo, or machinery spaces.

(e) There shall be no access, vents, or sounding tubes from fuel or cargo oil tanks opening into crew spaces, except that sounding tubes and access openings may be located in corridors.

(f) Where practicable, crew spaces shall be located entirely separate and independent of spaces allotted to passengers or licensed officers.

§ 92.20–15 *Construction.* (a) All crew spaces are to be constructed in a manner suitable to the purpose for which they are intended. The bulkheads separating the crew space from cargo and machinery spaces, lamp and paint rooms, storerooms, drying rooms, washrooms, and toilet spaces shall be made odorproof where deemed necessary by the Commandant.

(b) Toilet spaces, except when provided as private or semiprivate facilities, shall be so built, fitted, and situated, that no odor from them will readily enter other crew spaces.

(c) Where shell or unsheathed weather decks form boundaries of crew spaces, suitable protective coverings shall be applied to prevent formation or accumulation of moisture.

(d) Where crew spaces adjoin or are immediately above spaces such as galleys, machinery spaces or casings, donkey boiler rooms, etc., they shall be suitably protected from the heat.

(e) The interior sides and deck heads of crew spaces shall be covered with enamel, paint, or other material light in color.

(f) Crew spaces shall be properly drained where considered necessary.

(g) All washrooms and toilet rooms shall be properly drained and so constructed and arranged that they can be kept in a clean, workable, and sanitary condition. The scuppers shall be located in the lowest part of the space, due consideration being given to the average trim of the vessel.

§ 92.20–20 *Sleeping accommodations.*—(a) *Arrangements.* (1) Separate sleeping accommodations are to be provided for the deck, engine, and steward groups of the crew.

(2) Each watch of seamen, firemen or similar ratings on duty in watches is to be provided with separate sleeping room or rooms, unless the total space for accommodations makes this impracticable.

(3) Where practicable, each licensed officer shall be provided with a separate stateroom.

(b) *Size.* (1) Sleeping accommodations for the crew shall be divided into rooms, no one of which shall berth more than four persons.

(2) Each room shall be of such size that there are at least 30 square feet of deck area and a volume of at least 210 cubic feet for each person accommodated. The clear headroom shall be not less than 6 feet 3 inches. In measuring sleeping quarters allocated to crews of vessels, any equipment contained therein for the use of the occupants is not to be deducted from the total volume or from the deck area.

(c) *Equipment.* (1) Each person shall have a separate berth and not more than one berth shall be placed above another. The berths shall have a framework of metal or other hard, smooth material not likely to corrode or harbor vermin, and shall be so arranged that they provide ample room for easy occupancy. The overall size of a berth shall not be less than 30 inches wide by 76 inches long, except by special permission of the Commandant. Where berths adjoin, they shall be divided by a partition not less than 18 inches in height. Where two tiers of berths are fitted, the bottom of the lower must not be less than 12 inches above the deck, and the bottom of the upper must not be less than 2 feet 6 inches both from the bottom of the lower and from the deck overhead. The berths shall not be obstructed by pipes, ventilating ducts, or other installations.

(2) A locker of metal or other hard, smooth material shall be provided for each person accommodated in a room. Each locker shall be not less than 300 square inches in cross section area and 60 inches high. It shall be so placed as to be readily accessible. The interior of the locker shall be so arranged as to facilitate the proper stowage of clothes.

§ 92.20–25 *Washrooms and toilet rooms.* (a) There shall be provided at least one toilet, one washbasin, and one shower or bathtub for each eight members or portion thereof in the crew to be accommodated. The crew to be accommodated shall include all members who do not occupy rooms to which private or semiprivate facilities are attached.

(b) Under the following conditions, the toilet and washing facilities for the specific groups of the crew indicated shall be located in spaces separate from the facilities for other crew members; and shall be provided for that group in the ratios required by paragraph (a) of this section.

(1) The members of the engine department, where their number, exclusive of licensed officers, and others separately provided for, exceeds eight.

(2) The members of the steward's department, exclusive of those separately provided for, where their number exceeds eight.

(3) All female members of the crew.

(c) The toilet rooms and washrooms shall be located convenient to the sleeping quarters of the crew to which they are allotted but shall not open directly into such quarters except when they are provided as private or semiprivate facilties.

(d) All washbasins, showers, and bathtubs shall be equipped with proper plumbing, including hot and cold running water. Washbasins may be located in the crew sleeping quarters.

(e) The toilet rooms shall be separate from the washrooms and at least one washbasin shall be fitted in each toilet room, except where private or semiprivate facilities are provided and washbasins are installed in the sleeping rooms.

(1) All toilets shall be installed with proper plumbing for flushing. Toilets shall be provided with seats of the open front type that automatically lift up when not in use. Urinals may be fitted in toilet rooms, if desired, but no reduction in the required number of toilets will be made therefor.

(2) Where more than one toilet is located in a space or compartment, each toilet shall be separated by partitions, which shall be open at the top and bottom for ventilation and cleaning purposes.

§ 92.20–30 *Mess rooms.* (a) Mess rooms shall be located as near to the galley or suitably equipped serving pantry as is practicable except where mess room is equipped with a steam table. The mess rooms shall be of such size as to seat the number of persons normally scheduled to be eating at one time.

(b) Mess rooms shall be properly equipped with tables, seats, and other necessary equipment and shall be so arranged as to permit access to each seat.

§ 92.20–35 *Hospital space.* (a) Each vessel, which in the ordinary course of its trade makes voyages of more than three days duration between ports and which carries a crew of twelve or more, shall be provided with a hospital space. This space shall be situated with due regard to the comfort of the sick so that they may receive proper attention in all weathers.

(b) The hospital shall be suitably separated from other spaces and shall be used for the care of the sick and for no other purpose.

(c) The entrance shall be of such width and in such a position as to admit a stretcher case readily. Berths shall be of metal and may be in double tier, provided the upper berth is hinged and arranged to be secured clear of the lower berth when not in use. At least one berth shall be so arranged that it can be made accessible from both sides when necessary.

(d) The hospital shall be fitted with berths in the ratio of one berth to every twelve members of the crew or portion thereof who are not berthed in single occupancy rooms, but the number of berths need not exceed six.

(e) The hospital shall have a toilet, washbasin, and bath tub or shower conveniently situated. Other necessary suitable equipment of such character as clothes locker, table, seat, etc., shall be provided.

§ 92.20–40 *Other spaces.* (a) Sufficient facilities, depending upon the number of the crew, shall be provided where the crew may wash their own clothes. There shall be at least one tub or sink, fitted with the necessary plumbing, including hot and cold running water.

(b) Clothes drying facilities or space shall be provided for the needs of the crew.

(c) Recreation accommodations shall be provided. Where mess rooms are used for this purpose, they shall be suitably planned.

§ 92.20–45 *Lighting.* (a) All crew spaces shall be adequately lighted in accordance with the requirements of Subchapter J (Electrical Engineering) of this chapter.

(b) Berth lights shall be provided for each member of the crew.

§ 92.20–50 *Heating.* (a) All crew spaces shall be adequately heated in a manner suitable to the purpose of the space.

(b) The heating system will be considered satisfactory if it is capable of maintaining a minimum temperature of 70° F. under normal operating conditions without undue curtailment of the ventilation.

(c) Radiators and other heating apparatus shall be so placed, and where necessary shielded, as to avoid risk of fire, danger or discomfort to the occupants. Pipes leading to radiators or heating apparatus shall be lagged where those pipes create a hazard to persons occupying the space.

§ 92.20–55 *Insect screens.* (a) Except in such areas as are considered to be insect free, provision shall be made to protect the crew quarters against the admission of insects. This may be accomplished by the fitting of suitable screens to ventilating skylights, airports, ventilators, and doors to unscreened spaces and the open deck or by other methods.

§ 92.20–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels of less than 100 gross tons, contracted for prior to November 19, 1952, shall meet the general intent of § 92.20–5 and in addition shall meet the following requirements:

(1) Existing structure, arrangements, materials, and facilities, previously accepted or approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

(b) Vessels of 100 gross tons and over, contracted for prior to March 4, 1915, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction: *Provided,* That in no case will a greater departure from the standards of

§§ 92.20–5 through 92.20–55 be permitted than presently exists.

(c) Vessels of 100 gross tons and over, contracted for on or after March 4, 1915, but prior to January 1, 1941, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

(2) Where reasonable and practicable, a minimum of one toilet, shower, and washbasin shall be provided for each 10 members of the crew or fraction thereof.

(3) Crew spaces shall have a volume of at least 120 cubic feet and a deck area of at least 16 square feet for each person accommodated.

(4) Each crew member shall have a separate berth, and berths may not be placed more than two high.

(5) Each vessel, which in the ordinary course of its trade makes a voyage of more than three days' duration between ports and which carries a crew of 12 or more persons, shall be provided with a suitable hospital space for the exclusive use of the sick or injured. Berths shall be provided in the ratio of one berth for each twelve members of the crew or fraction thereof, but the number of berths need not exceed six.

(6) The crew spaces shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, and arranged, and where practicable, shall be insulated from undue noise and effluvia.

(d) Vessels of 100 gross tons and over, contracted for on or after January 1, 1941, but prior to November 19, 1952, shall meet the requirements of this paragraph.

(1) Existing structure, arrangements, materials, and facilities, previously approved will be considered satisfactory so long as they are maintained in a suitable condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original construction.

(2) Washrooms and toilet rooms:

(i) There shall be a minimum of one toilet, shower, and washbasin for each 8 members of the crew or fraction thereof who are not accommodated in rooms having attached private or semiprivate facilities.

(ii) Separate facilities shall be provided for the engine room, deck, or stewards department when the number of crew in that department, exclusive of officers, exceeds 8.

(iii) Toilet rooms shall be separate from the wash rooms. At least one washbasin shall be installed in each toilet room.

(iv) Toilets shall be provided with seats of the open front type that automatically lift up when not in use. Urinals may be fitted in toilet rooms if desired, but no reduction will be made in the required number of toilets.

(v) Washbasins, showers, and bath tubs if substituted for showers, shall be equipped with proper plumbing including hot and cold running water.

(3) Crew spaces shall have a volume of at least 120 cubic feet and a deck area of at least 16 square feet for each person accommodated.

(4) Each crew member shall have a separate berth, and berths may not be placed more than two high.

(5) Each vessel, which in the ordinary course of its trade makes a voyage of more than three days duration between ports and which carries a crew of 12 or more persons, shall be provided with a suitable hospital space for the exclusive use of the sick or injured. Berths shall be provided in the ratio of one berth for each 12 members of the crew or fraction thereof, but the number of berths need not exceed six.

(6) The crew spaces shall be securely constructed, properly lighted, heated, drained, ventilated, equipped, located, and arranged, and where practicable, shall be insulated from undue noise and effluvia.

SUBPART 92.25—RAILS AND GUARDS

§ 92.25–1 *Application.* (a) The provisions of this subpart, with the exception of § 92.25–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 92.25–90.

§ 92.25–5 *Where rails required.* (a) Rails or equivalent protection shall be installed near the periphery of all weather decks accessible to persons on board. Such rails shall be in at least 2 courses, and shall be at least 36 inches high unless it can be shown to the satisfaction of the Officer in Charge, Marine Inspection, that the installation of rails of such height would be unreasonable and impracticable, having regard to the business of the vessel.

§ 92.25–10 *Storm rails.* (a) On vessels in ocean and coastwise service, suitable storm rails shall be installed in all passageways and at the deck house sides where persons on board might have normal access. Storm rails shall be installed on both sides of passageways which are 6 feet or more in width.

§ 92.25–15 *Guards in dangerous places.* (a) Suitable hand covers, guards, or rails shall be installed in way of all exposed and dangerous places such as gears, machinery, etc.

§ 92.25–90 *Vessels contracted for prior to November 19, 1952.* (a) Existing structure, arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original construction: *Provided,* That in no case will greater departure from the standards of §§ 92.25–5 through 92.25–15 be permitted than presently exists.

PART 93—STABILITY

Chapter I is amended by adding a new Part 93 to Subchapter I, reading as follows:

SUBPART 93.01—APPLICATION

Sec.

93.01–1 General.

SUBPART 93.05—STABILITY TEST

93.05–1 When required.
93.05–5 Procedure.

SUBPART 93.10—STABILITY INFORMATION FOR OPERATING PERSONNEL

93.10–1 Information supplied to master.

SUBPART 93.15—STABILITY LETTER

93.15–1 Posting.
93.15–5 Instructions contained in stability letter.

AUTHORITY: §§ 93.01–1 to 93.15–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4490, as amended, 41 Stat. 305, secs. 1, 2, 49 Stat. 1544, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 482, 483, 363, 367, 50 U. S. C. App. 1275.

SUBPART 93.01—APPLICATION

§ 93.01–1 *General.* (a) The provisions of this part shall apply to the following vessels:

(1) All mechanically propelled vessels of 500 gross tons and over, contracted for on or after November 19, 1952, when engaged upon an international voyage, except yachts and fishing vessels.

(2) Any other vessel whose stability is questioned by the Commandant or the Officer in Charge, Marine Inspection.

SUBPART 93.05—STABILITY TEST

§ 93.05–1 *When required.* (a) Except as otherwise provided in this section, each vessel to which this part pertains shall be subjected to a stability test conducted under the supervision of the Coast Guard and the results of the test shall be approved before the vessel is placed in service.

(b) The Commandant may allow the stability test of a vessel to be dispensed with provided basic stability data are available from the stability test of a sister vessel and it is shown to the satisfaction of the Commandant that reliable stability information for the exempted vessel can be obtained from such basic data.

§ 93.05–5 *Procedure*—(a) *Stability tests.* Stability tests conducted on or after November 19, 1952, shall meet the requirements of this section.

(b) *Plans required.* (1) The following plans are essential for use in conducting the stability test and determining the results, and if these plans have not been previously submitted, they shall be made available at the time of the test:

Lines plan.
Curves of form, or hydrostatic curves.
General arrangement plan of decks, holds, inner bottoms, etc.
Inboard and outboard profile.
Midship section.
Capacity plan showing capacities and vertical and longitudinal centers of gravity of cargo spaces, tanks, etc.
Tank sounding tables.
Draft mark locations.

(c) *Stability test preparations.* (1) Preparations as noted in this paragraph shall be made to place a vessel in suitable condition for a stability test. The Coast Guard representative supervising the stability test may relax from these

standards in a particular instance if, in his opinion, such relaxation is warranted and will not materially affect the reliability of the results of the test.

(2) To obtain dependable stability results, all tanks on the vessel, as far as practicable, shall be either completely empty and dry or fully pressed up and without air pockets. Where this is impracticable, slack tanks may be accepted provided their free surface can be readily and accurately determined for the angles of heel to be obtained during the stability test.

(3) The vessel shall be as nearly complete as practicable when the test is conducted. If additional material or equipment is to be installed after the test, a complete list of such items by weight and location shall be prepared.

(4) All dunnage, tools, and other items extraneous to the completed vessel shall be removed before the test.

(5) The vessel shall be moored in a location reasonably protected from broadside wind, waves, and tide. The depth of water shall be sufficient to provide ample clearance under the vessel against grounding. Mooring lines shall be arranged so that they will not interfere with the free rolling or listing of the vessel.

SUBPART 93.10—STABILITY INFORMATION FOR OPERATING PERSONNEL

§ 93.10–1 *Information supplied to master.* (a) Based on the results of the stability test, information shall be prepared by the owners, approved by the Commandant, and furnished to the master which sets forth the stability data necessary to permit efficient handling of the vessel. In general, this information shall be such that the master can readily determine the metacentric height and determine the freeboard for any condition of loading.

(b) In the case of a vessel which due to its design or type of service, etc. requires special consideration of its stability characteristics, the information shall also include an indication of any operating conditions which must be maintained to assure the safety of the vessel.

SUBPART 93.15—STABILITY LETTER

§ 93.15–1 *Posting.* (a) Each vessel subject to the requirements of this part shall have posted under glass in the pilothouse a stability letter issued by the Coast Guard before the vessel is placed in service.

§ 93.15–5 *Instructions contained in stability letter.* (a) The stability letter shall set forth the master's responsibility for maintaining satisfactory stability conditions at all times, and will contain a reference to the latest approved stability information.

Part 94 is amended to read as follows:

PART 94—LIFESAVING EQUIPMENT

SUBPART 94.01—APPLICATION

Sec.
94.01–1 Applicable to all vessels.
94.01–5 Equipment installed but not required.

SUBPART 94.05—GENERAL PROVISIONS PERTAINING TO LIFESAVING EQUIPMENT

Sec.
94.05–1 Equipment of an approved type.

SUBPART 94.10—LIFEBOATS AND LIFE RAFTS

94.10–1 Application.
94.10–5 Type of lifeboats and life rafts required.
94.10–10 Requirements for vessels in ocean or coastwise service other than barges; towing, fishing, wrecking, and whale factory vessels; pilot boats; and yachts.
94.10–15 Requirements for seagoing barges in ocean or coastwise service.
94.10–20 Requirements for towing, fishing, and wrecking vessels, and pilot boats in ocean or coastwise service.
94.10–25 Requirements for yachts in ocean or coastwise service.
94.10–30 Requirements for whale factory vessels in ocean or coastwise service.
94.10–40 Requirements for vessels in Great Lakes; lakes, bays, and sounds; or river service other than fireboats, wrecking and fishing vessels, pilot boats, and yachts.
94.10–45 Requirements for fireboats, wrecking and fishing vessels, and pilot boats in Great Lakes; lakes, bays, and sounds; or river service.
94.10–50 Requirements for yachts in Great Lakes; lakes, bays, and sounds; or river service.
94.10–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.15—STOWAGE AND MARKING OF LIFEBOATS AND LIFE RAFTS

Sec.
94.15–1 Application.
94.15–5 General.
94.15–10 Stowage.
94.15–15 Marking.
94.15–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.20—EQUIPMENT FOR LIFEBOATS AND LIFE RAFTS

94.20–1 Application.
94.20–5 General.
94.20–10 Required equipment for lifeboats.
94.20–15 Description of equipment for lifeboats.
94.20–20 Required equipment for life rafts.
94.20–25 Description of equipment for life rafts.
94.20–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.25—DAVITS

94.25–1 Application.
94.25–5 General.
94.25–10 Requirements for vessels in ocean or coastwise service.
94.25–15 Requirements for vessels in Great Lakes, lakes, bays, and sounds, or river service.
94.25–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.30—LIFEBOAT WINCHES

94.30–1 Application.
94.30–5 General.
94.30–10 Number and type required.
94.30–15 Installation.
94.30–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.33—BLOCKS AND FALLS

Sec.
94.33–1 Application.
94.33–5 General.
94.33–10 Installations where lifeboat winches are used.
94.33–15 Installations where lifeboat winches are not used.
94.33–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.35—INSTALLATION OF LIFEBOATS, DAVITS AND WINCHES

94.35–1 Application.
94.35–5 Tests and examinations.

SUBPART 94.40—LIFE PRESERVERS

94.40–1 Application.
94.40–5 General.
94.40–10 Number required.
94.40–15 Distribution and stowage.
94.40–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.43—RING LIFE BUOYS AND WATER LIGHTS

Sec.
94.43–1 Application.
94.43–5 General.
94.43–10 Number required.
94.43–15 Distribution and securing.
94.43–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.45—LINE-THROWING APPLIANCES

94.45–1 Application.
94.45–5 General.
94.45–10 Type required.
94.45–15 Equipment for line-throwing appliances.
94.45–20 Accessibility.
94.45–25 Service recommendations.
94.45–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.50—EMBARKATION AIDS

94.50–1 Application.
94.50–5 Ladders.
94.50–10 Illumination for lifeboat launching operations.
94.50–90 Vessels contracted for prior to November 19, 1952.

SUBPART 94.55—PORTABLE RADIO APPARATUS

94.55–1 Required on international voyage.

SUBPART 94.90—SHIP'S DISTRESS SIGNALS

94.90–1 Application.
94.90–5 Vessels in ocean or coastwise service.
94.90–10 Vessels in Great Lakes service.

AUTHORITY: §§ 94.01–1 to 94.90–10 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4481, 4482, 4488, 4491, as amended, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 484, 475, 481, 489, 367, 526p, 50 U. S. C. App. 1275.

SUBPART 94.01—APPLICATION

§ 94.01–1 *Applicable to all vessels.* (a) The provisions of this part shall apply to all vessels except as specifically noted in this part.

§ 94.01–5 *Equipment installed but not required.* (a) Where items of lifesaving equipment are not required, but are installed, such equipment and its installation shall meet the requirements of this part.

SUBPART 94.05—GENERAL PROVISIONS PERTAINING TO LIFESAVING EQUIPMENT

§ 94.05–1 *Equipment of an approved type.* (a) Where equipment in this part is required to be of an approved type, such equipment requires the specific approval of the Commandant. Such approvals are published in the FEDERAL REGISTER and in addition, are contained in Coast Guard publication CG 190, "Equipment Lists for Merchant Vessels."

(b) Specifications for many of the items required to be of an approved type have been promulgated and are contained in Subchapter Q (Specifications) of this chapter. In general, such specifications are of interest only to the manufacturer of specific items of equipment.

SUBPART 94.10—LIFEBOATS AND LIFE RAFTS

§ 94.10–1 *Application.* (a) The provisions of this subpart, with the exception of § 94.10–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.10–90.

§ 94.10–5 *Type of lifeboats and life rafts required*—(a) *Lifeboats.* (1) All lifeboats shall be of an approved type, constructed in accordance with Subpart 160.035 of Subchapter Q (Specifications) of this chapter, except as specifically noted in this part.

(2) All lifeboats certified to carry 60 or more persons shall be either motor-propelled of Class A or Class B, or shall be fitted with an approved type of hand-propelling gear.

(3) Class A motor-propelled lifeboats shall be fitted with a compression-ignition engine, a radio cabin and a radio installation complying with the requirements of the Federal Communications Commission, and a searchlight constructed in accordance with Subpart 161.006 of Subchapter Q. Class B motor-propelled lifeboats need not have an engine of the compression-ignition type or a radio or searchlight.

(4) Except as further modified in this subparagraph, all lifeboats, except those installed on vessels in river service, shall be fitted with suitable disengaging apparatus consisting of fixed hooks in the lifeboat or mechanical disengaging apparatus. Mechanical disengaging apparatus, if fitted, shall be of an approved type, constructed in accordance with Subpart 160.033 of Subchapter Q (Specifications) of this chapter.

(i) All lifeboats installed on ocean or coastwise vessels of over 3,000 gross tons shall be fitted with mechanical disengaging apparatus so arranged as to make it possible for the lifeboats to be launched with their full complement of persons and equipment while such vessels are under way or stopped, and for both ends of the lifeboat to be released simultaneously, under tension or not, by one person. Simultaneous release shall be effected by partially rotating a shaft which shall be continuous and extend from points of contact with the hooks.

(ii) All lifeboats installed on any particular vessel shall be fitted with the same type of disengaging apparatus.

(iii) On small vessels, the Commandant may approve means other than those previously mentioned to agree with the needs of a particular vessel.

(b) *Life rafts.* (1) All life rafts shall be of an approved type, constructed in accordance with Subpart 160.018 of Subchapter Q (Specifications) of this chapter. Type A life rafts shall be stowed on the standard life raft skids required by § 94.15–10 (c) (1) unless specifically noted otherwise.

§ 94.10–10 *Requirements for vessels in ocean or coastwise service other than barges; towing, fishing, wrecking, and whale factory vessels; pilot boats; and yachts.* (a) All vessels shall be provided with sufficient lifeboats on each side of the vessel to accommodate all persons on board.

(b) Lifeboats shall be not less than 24 feet in length, except where owing to the size of the vessel, or for other reasons, the Commandant considers the carriage of such lifeboats to be unreasonable or impracticable. However, in no case shall lifeboats of less than 16 feet in length be used.

(c) All vessels of 1,600 gross tons and over on an international voyage shall carry at least one motor-propelled lifeboat of Class B, or one hand-propelled lifeboat.

§ 94.10–15 *Requirements for seagoing barges in ocean or coatwise service.* (a) All manned seagoing barges of 100 gross tons and over shall be provided with a lifeboat of sufficient capacity for all persons on board. All lifeboats shall have a capacity of at least 80 cubic feet.

§ 94.10–20 *Requirements for towing, fishing, and wrecking vessels, and pilot boats in ocean or coastwise service.* (a) All vessels of 500 gross tons and over on an international voyage, other than fishing vessels, shall meet the applicable requirements of § 94.10–10 in lieu of the requirements of this section.

(b) All vessels shall carry sufficient lifeboats for all persons on board. In lieu of the standard lifeboats required by § 94.10–5 (a), the following types of boats may be used:

(1) Vessels engaged exclusively in the business of purse seining may use their seine boats.

(2) Vessels engaged exclusively in the business of hook and line fishing from dories may use their dories provided they are fitted with air tanks of sufficient capacity to meet the requirements of Subpart 160.035 of Subchapter Q (Specifications) of this chapter for lifeboats.

(3) Vessels engaged exclusively in the business of wrecking may use their surf boats.

(4) Vessels engaged exclusively in the business of furnishing pilots to vessels may use their launches and/or yawls.

(c) All lifeboats shall have a capacity of at least 180 cubic feet. However, the Coast Guard District Commander may, in exceptional cases, permit smaller lifeboats where the crew is insufficient to handle the larger lifeboat or where there is lack of space to carry such larger lifeboat. In no case may lifeboats be used having a capacity of less than 125 cubic feet.

§ 94.10–25 *Requirements for yachts in ocean or coastwise service.* (a) All yachts in ocean service shall have an aggregate lifeboat and life raft capacity for all persons on board. Not less than 75 percent of the required capacity shall be in lifeboats and the remainder may be in Type A or Type B life rafts.

(b) All yachts in coastwise service shall have an aggregate lifeboat and life raft capacity as required in paragraph (a) of this section, except that during the interval between May 15 and October 15 in any one year, both dates inclusive, they shall only be required to be equipped with lifeboat and life raft capacity to accommodate 70 percent of all persons on board, not less than 50 percent of the required capacity shall be in lifeboats and the remainder may be in Type A or Type B life rafts.

(c) All lifeboats shall have a capacity of at least 125 cubic feet. However, The Coast Guard District Commander may, if he deems it proper, modify the requirements as to the size of lifeboats.

(d) Yachts may use their launches in lieu of the standard lifeboats required by § 94.10–5 (a), provided the launches are equipped with air tanks of sufficient capacity to meet the requirements of Subpart 160.035 of Subchapter Q (Specifications) of this chapter for lifeboats. Such launches shall be fitted with suitable name boards or the name of the vessel shall be painted on the bow or stern.

§ 94.10–30 *Requirements for whale factory vessels in ocean or coastwise service.* (a) Every vessel employed as a whale factory vessel shall carry lifeboats on each side of the vessel of such aggregate capacity as will accommodate every member of the crew engaged to work the vessel. In addition, such vessels shall carry lifeboats of aggregate capacity sufficient to accommodate the total number of additional persons which the vessel carries.

(b) Lifeboats shall be not less than 24 feet in length, except where owing to the size of the vessel, or for other reasons, the Commandant considers the carriage of such lifeboats to be unreasonable or impractical. However, in no case shall lifeboats of less than 16 feet in length be used.

(c) All vessels of 1,600 gross tons and over on an international voyage shall carry at least one motor-propelled lifeboat of Class B or one hand-propelled lifeboat.

§ 94.10–40 *Requirements for vessels in Great Lakes; lakes, bays, and sounds; or river service other than fireboats, wrecking and fishing vessels, pilot boats, and yachts.* (a) All vessels shall be provided with lifeboats and life rafts as required by Table 94.10–40 (a).

TABLE 94.10-40 (a)—LIFEBOATS AND LIFE RAFTS REQUIRED ON VESSELS IN GREAT LAKES; LAKES, BAYS, AND SOUNDS AND RIVER SERVICE OTHER THAN FIREBOATS, WRECKING AND FISHING VESSELS, PILOT BOATS, AND YACHTS

	Great Lakes			Lakes, bays, and sounds		Rivers	
		Other vessels					
	Vessels carrying cargo	50 gross tons and over	Under 50 gross tons	50 gross tons and over	Under 50 gross tons	50 gross tons and over	Under 50 gross tons
Percentage of persons to be accommodated.	100	100	100	100	100	Only 1 lifeboat required.[3]	Only lifeboats or life rafts as in the judgment of Officer in Charge, Marine Inspection, are necessary.
Percentage of required equipment in lifeboats.	[1] 100	[1] 50	Either lifeboats or life rafts.	[2] 50	Either lifeboats or life rafts.	do	Do.
Percentage of required equipment which may be in Type A or Type B life rafts.	None	50	do	50	do	do	Do.

[1] When of 300 gross tons and over vessels carrying cargo and towing vessels shall have in addition to all other lifeboats and life rafts required one fully equipped Type A or Type B life raft of not less than 15 persons capacity. This life raft shall be stowed (not necessarily on skids) so that it will float clear in the event of sinking of the vessel.

[2] Harbor towing vessels of less than 150 gross tons may substitute one or more life rafts of Type A or Type B for the lifeboats required if the lifeboats interfere with the practical operation of the vessel and the substitution may be made with safety in the opinion of the Officer in Charge, Marine Inspection.

[3] Vessels navigating waters where the average depth of the channel does not exceed 3 feet shall not be required to be equipped with lifeboats or life rafts.

§ 94.10-45 *Requirements for fireboats, wrecking and fishing vessels, and pilot boats in Great Lakes; lakes, bays, and sounds; or river service.* (a) All vessels of 50 gross tons and over shall have an aggregate lifeboat and life raft capacity to accommodate all persons on board. Not less than 50 percent of such capacity shall be in lifeboats and the remainder may be in Type A or Type B life rafts.

(b) All vessels of less than 50 gross tons shall have an aggregate lifeboat and life raft capacity to accommodate all persons on board. The life rafts may be either Type A or Type B.

(c) In lieu of the standard lifeboats required by § 94.10-5 (a) the following types of boats may be used:

(1) Vessels used exclusively as fireboats and connected to or belonging to a regularly organized fire department shall be required to carry only such boats or rafts as in the judgment of the Officer in Charge, Marine Inspection, may be required to carry the crew.

(2) Vessels engaged exclusively in the business of furnishing pilots to vessels may use their launches and/or yawls.

(3) Vessels engaged exclusively in the business of wrecking may use their surf boats.

(4) Vessels engaged exclusively in the business of seine fishing may use their seine boats.

§ 94.10-50 *Requirements for yachts in Great Lakes; lakes, bays, and sounds; or river service.* (a) All yachts shall be fitted with lifeboats and life rafts as required by Table 94.10-40 (a), depending upon the service. Alternatively, such equipment may be provided as required by Table 75.10-20 (a) of Subchapter H (Passenger Vessels) of this chapter.

§ 94.10-90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.10-5 through 94.10-50 shall be complied with insofar as the number and general type of lifesaving equipment is concerned. Existing items of lifesaving equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 94.10-5 through 94.10-50 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be permitted to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable specifications or requirements.

(2) On vessels of over 3,000 gross tons in ocean and coastwise service, all replacements of disengaging apparatus shall meet the requirements of § 94.10-5 (a) (4) (i). On all other vessels in any service, all of the lifeboats on a particular vessel shall be fitted with the same type of disengaging apparatus.

(3) The requirements of § 94.10-10 (c) shall not apply except for replacements, and then only if it can be done without change to existing davits and arrangements.

SUBPART 94.15—STOWAGE AND MARKING OF LIFEBOATS AND LIFE RAFTS

§ 94.15-1 *Application.* (a) The provisions of this subpart, with the exception of § 94.15-90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.15-90.

§ 94.15-5 *General.* (a) The lifeboats and life rafts shall be readily available in case of emergency, and shall be kept in good working order and available for immediate use at all times when the vessel is being navigated and, insofar as reasonable and practicable, while the vessel is not being navigated.

(b) The decks on which lifeboats and life rafts are carried shall be kept clear of freight or any other obstructions which would interfere with the immediate launching of the lifesaving appliance.

§ 94.15-10 *Stowage*—(a) *General.* Lifeboats and life rafts shall be stowed in such a manner that:

(1) They are capable of being launched in the shortest possible time.

(2) They shall not impede the launching or handling of other lifesaving appliances.

(3) They shall not impede the marshalling of persons at the embarkation stations, or their embarkation.

(4) They shall be capable of being put in the water safely and rapidly even under unfavorable conditions of list and trim.

(b) *Lifeboat stowage.* (1) Suitable access to the lifeboats shall be provided to enable the crew to prepare the lifeboats for launching.

(2) Lifeboats shall be so stowed that embarkation into them may be made rapidly and in good order.

(3) Lifeboats shall not be stowed in the bows of the vessel nor as far aft as to be endangered by the propellers or overhang of the stern.

(4) Lifeboats shall be so stowed that it shall not be necessary to lift them in order to swing out the davits, except on small vessels where such requirement is unreasonable and impracticable in the opinion of the Officer in Charge, Marine Inspection.

(5) On vessels in ocean or coastwise service, lifeboats, when stowed on a deck more than 15 feet above the deepest seagoing draft, shall be fitted with skates or other suitable means to facilitate launching against an adverse list of up to 15 degrees. However, skates may be dispensed with if, in the opinion of the Commandant, the arrangements are such as to insure that the lifeboats can be satisfactorily launched without such skates.

(c) *Life raft stowage.* (1) Type A life rafts shall be stowed on standard skids constructed in accordance with Subpart 160.042 of Subchapter Q (Specifications) of this chapter.

(2) Type B life rafts shall be stowed in such a manner that they may be readily launched.

(3) The additional life raft required on Great Lakes vessels by Table 94.10-40 (a) shall be stowed in such a manner that it will float clear in the event of sinking of the vessel. The requirements of subparagraphs (1) and (2) of this paragraph need not be complied with for such life raft.

§ 94.15-15 *Marking.* (a) Lifeboats and life rafts shall be marked as required by §§ 97.37-37 and 97.37-40 of this subchapter.

§ 94.15-90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) The provisions of §§ 94.15-5 through 94.15-15 shall be met with the exception that the requirements of § 94.15-5 (b) (5) need only apply if, in the opinion of the Officer in Charge, Marine Inspection, the arrangement or

construction of the vessel is such that overhanging decks, openings, or other similar obstructions, make the use of skates or similar appliances necessary.

SUBPART 94.20—EQUIPMENT FOR LIFEBOATS AND LIFE RAFTS

§ 94.20–1 *Application.* (a) The provisions of this subpart with the exception of § 94.20–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.20–90.

§ 94.20–5 *General.* (a) Equipment for lifeboats and life rafts shall be of good quality, efficient for the purpose they are intended to serve, and kept in good condition.

(b) Lifeboats and life rafts shall be fully equipped before the vessel is navigated and the equipment shall remain in such lifesaving appliances throughout the voyage, except as provided in § 97.15–45 (e) of this subchapter.

(c) It shall be unlawful to stow in any lifeboat or life raft any article not required by this subpart unless such article can be properly stowed so as not to reduce the seating capacity or space available to the occupants and so as not to adversely affect the seaworthiness of such appliances or, in the case of lifeboats, overload the davits or winches.

(d) Loose equipment, except boathooks in lifeboats, shall be securely attached to the lifesaving appliance to which it belongs.

§ 94.20–10 *Required equipment for lifeboats.* (a) The lifeboats for all vessels shall be equipped in accordance with Table 94.20–10 (a). For a description of the items contained in this table, and the units comprising the items, see the applicable paragraphs of § 94.20–15. The letter identification prefixing the item in the table corresponds to the paragraph designations in § 94.20–15.

TABLE 94.20–10 (a)

Letter identification	Item	Ocean and coastwise		Great Lakes		Lakes, bays, and sounds; and rivers
		Other than seagoing barges	Seagoing barges	Vessels carrying cargo	Other	
(a)	Bailer	1	None	1	None	None
(b)	Bilge pump	[1] 1	None	None	None	None
(c)	Boathooks	2	2	1	1	1
(d)	Bucket	2	1	1	1	1
(e)	Compass and mounting	1	None	None	None	None
(f)	Ditty bag	1	None	None	None	None
(g)	Drinking cups	1	1	None	None	None
(h)	Fire extinguishers (motor-propelled lifeboats only)	2	2	2	2	2
(i)	First-aid kit	1	None	None	None	None
(j)	Flashlight	1	None	[3] 1	None	None
(k)	Hatchets	2	None	2	1	1
(l)	Heaving line	[3]	None	None	None	None
(m)	Jackknife	1	1	None	None	None
(n)	Ladder, lifeboat gunwale	[3] 1	None	None	None	None
(o)	Lantern	1	1	1	1	1
(p)	Life line	1	1	1	1	1
(q)	Life preservers	2	2	2	2	2
(r)	Locker	1	None	1	None	None
(s)	Mast and sail (oar-propelled lifeboats only)	1	None	None	None	None
(t)	Matches	2	2	1	1	1
(u)	Milk, condensed (pounds per person)	1	None	None	None	None
(v)	Mirrors, signaling	2	None	None	None	None
(w)	Oars	[4] 1 unit	[4] 1 unit	[4] 1 unit	[4] 1 unit	[4] 1 unit
(x)	Oil, illuminating (quarts)	1	None	1	None	None
(y)	Oil, storm (gallons)	1	None	1	None	None
(z)	Painter	2	1	[3] 1	1	1
(aa)	Plugs	[3] 1	[3] 1	1	1	1
(bb)	Provisions (pounds per person)	2	None	None	None	None
(cc)	Rowlocks	[4] 1 unit	[4] 1 unit	[4] 1 unit	[4] 1 unit	[4] 1 unit
(dd)	Rudder and tiller	1	1	1	1	None
(ee)	Sea anchor	1	None	1	None	None
(ff)	Signals, distress, floating orange smoke	2	None	None	None	None
(gg)	Signals, distress, red hand flare	[4] 1 unit	None	[4] [6] 1 unit	None	None
(hh)	Signals, distress, red parachute flare	[4] [6] 1 unit	None	[3] [6] 1 unit	None	None
(ii)	Water (quarts per person)	3	1	None	None	None

[1] Motor-propelled lifeboats, certified for 100 or more persons, shall be fitted with an additional hand bilge pump of an approved type or a power bilge pump.
[2] Optional—see footnote 5.
[3] Not required on lifeboats of less than 60 persons capacity.
[4] For description of units, see § 94.20–15.
[5] An approved flashlight, item (j), or 12 approved parachute red flare distress signals, item (hh), may be substituted for 6 of the required 12 hand red flare distress signals.
[6] Vessels in coastwise service need only carry one unit for each 5 lifeboats or fraction thereof.

§ 94.20–15 *Description of equipment for lifeboats*—(a) *Bailer.* The bailer shall have a lanyard attached and shall be of sufficient size and suitable for bailing.

(b) *Bilge pump.* Bilge pumps shall be of an approved type, constructed in accordance with Subpart 160.044 of Subchapter Q (Specifications) of this chapter. They shall be of the size given in Table 94.20–15 (b) depending upon the capacity of the lifeboat as determined by the six-tenths rule as described in § 160.035–8 (b) of Subchapter Q (Specifications) of this chapter.

TABLE 94.20–15 (b)

Capacity of lifeboat, cubic feet		Bilge pump size
Over	Not over	
----------	[illegible]	1
330	700	2
700	----------	[illegible]

(c) *Boathooks.* Boathooks shall be of the single hook ball-point type. Boathook handles shall be of clear grained white ash, or equivalent, and of a length and diameter as given in Table 94.20–15 (c).

TABLE 94.20–15 (c)

Length of lifeboat, feet		Boathook handles	
Over	Not over	Diameter, inches	Length, feet
----------	23	1½	8
23	29	1¾	10
29	----------	2	12

(d) *Bucket.* The bucket shall be of heavy gage galvanized iron, or other suitable corrosion-resistant metal, of not less than 2-gallon capacity, and shall have a 6-foot lanyard of 12-thread manila attached.

(e) *Compass and mounting.* The compass and mounting shall be of an approved type constructed in accordance with U. S. Coast Guard specification dated December 14, 1944.

(f) *Ditty bag.* The ditty bag shall consist of a canvas bag and shall contain a sailmaker's palm, needles, sail twine, marline, and marline spike.

(g) *Drinking cups.* Drinking cups shall be enameled, and shall be provided with ⅛-inch diameter cotton lanyards 3 feet in length.

(h) *Fire extinguisher.* Fire extinguishers shall be of approved Type B–C, Size I (see § 95.50–5 of this subchapter). One shall be attached to each end of the lifeboat.

(i) *First-aid kit.* The first-aid kit shall be of an approved type, constructed and fitted in accordance with Subpart 160.041 of Subchapter Q (Specifications) of this chapter.

(j) *Flashlight.* The flashlight shall be of an approved Type I, Size No. 3, constructed in accordance with Subpart 161.008 of Subchapter Q (Specifications) of this chapter. Three spare batteries and two spare bulbs shall be provided with each flashlight. Batteries shall not remain in the flashlight or be used as spares beyond the serviceable date appearing on the cell or its jacket.

(k) *Hatchet.* Hatchets shall be of an approved type, constructed in accordance with Subpart 160.013 of Subchapter Q (Specifications) of this chapter. They shall be attached to the lifeboat by individual lanyards and be readily available for use, one at each end of the lifeboat.

(l) *Heaving line.* The heaving line shall be of adequate strength, 10 fathoms in length, and 1 inch in circumference. It shall be of such quality as to be buoyant after 24 hours' submergence.

(m) *Jackknife.* The jackknife (with can opener) shall be of an approved type, constructed in accordance with Subpart 160.043 of Subchapter Q (Specifications) of this chapter.

(n) *Ladder, lifeboat gunwale.* The lifeboat gunwale ladder shall consist of 3 flat wood steps cut out for hand holds. The steps shall be spaced 12 inches apart and fastened with ⅝ inch diameter manila rope. Each rope end shall be tied inside the lifeboat at about amidships with the ladder stowed on top of the side benches and ready for immediate use. Other suitable devices may be specifically approved.

(o) *Lantern.* The lantern shall contain sufficient oil to burn for at least 9 hours, and shall be ready for immediate use.

(p) *Life line.* The life line shall be properly secured to both sides of the lifeboat along its entire length, festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12 thread manila. The bights shall hang to within 12 inches of the water when the lifeboat is light.

(q) *Life preservers.* Life preservers shall be of an approved type, constructed in accordance with the applicable subparts of Subchapter Q (Specifications) of this chapter.

(r) *Locker.* The locker shall be suitable for the storage and preservation of the small items of equipment.

(s) *Mast and sail.* A unit, consisting of a standing lug sail together with the necessary spars and rigging, shall be provided in general agreement with Table 94.20–15 (s). The sails shall be of good quality canvas, colored Indian Orange (Cable No. 70072, Standard Color Card of America). Rigging shall consist of galvanized wire rope not less than $^3/_{16}$ inch in diameter. The mast and sail shall be protected by a suitable canvas cover.

TABLE 94.20–15 (s)

Length of lifeboat, feet		Standing lug sail							Mast [1]		Yard [1]	
Over	Not over	Area, square feet	Luff and head lengths	Leach length	Foot length	Clew to throat	Ounces per square yard	Commercial designation No.	Length	Diameter, inches	Length	Diameter, inches
			Ft. In.	Ft. In.	Ft. In.	Ft. In.			Ft. In.		Ft. In.	
	17	58	5 11	12 1	8 10	10 10	13.35	10	11 2	3	6 11	2
17	19	74	6 8	13 8	10 0	12 2	14.35	10	12 6	3	7 8	2
19	21	93	7 5	15 1	11 2	13 8	14.35	10	13 10	3½	8 5	2½
21	23	113	8 3	16 11	12 3	15 1	14.35	10	15 2	3½	9 3	2½
23	25	135	9 0	18 6	13 6	16 6	14.35	10	16 6	4	10 0	3
25	27	158	9 9	20 0	14 7	17 10	17.50	8	17 10	4	10 9	3
27	29	181	10 5	21 5	15 7	19 1	17.50	8	19 2	4½	11 5	3¼
29	31	203	11 0	22 8	16 6	20 3	20.74	6	20 6	4½	12 0	3¼
31	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]

[1] Mast lengths measured from heel to center of upper halyard sheave. Mast diameters measured at thwart. Mast and yard shall be of clear-grained spruce, fir, or equivalent.
[2] Subject to special consideration.

(t) *Matches.* A box of friction matches in a watertight container stowed in an equipment locker or secured to the underside of the stern thwart if no locker is fitted.

(u) *Milk, condensed.* One pound of condensed milk shall be provided for each person the lifeboat is certified to carry, to be stowed in lockers or other compartments providing suitable protection.

(v) *Mirrors, signaling.* Signaling mirrors shall be of an approved type.

(w) *Oars.* A unit, consisting of a complement of rowing oars and steering oar, shall be provided for each lifeboat in accordance with Table 94.20–15 (w), except that motor-propelled and hand-propelled lifeboats need only be equipped with 4 rowing oars and 1 steering oar. In any case, the emergency lifeboats shall be provided with the full complement of oars prescribed by the table.

TABLE 94.20–15 (w)

Length of lifeboat, feet		Number of oars		Length of oars, feet	
Over	Not over	Rowing	Steering	Rowing	Steering
	15	4	1	8	9
15	19	6	1	10	11
19	21	6	1	11	12
21	23	6	1	12	13
23	25	8	1	13	14
25	27	8	1	14	15
27	----	8	1	15	16

(x) *Oil, illuminating.* One quart of illuminating oil shall be provided in a metal container.

(y) *Oil, storm.* One gallon of vegetable, fish, or animal oil shall be provided in a suitable metal container so constructed as to permit a controlled distribution of oil on the water, and so arranged that it can be attached to the sea anchor.

(z) *Painter.* Painters shall be of manila rope not less than 2¾ inches in circumference and of a length not less than 3 times the distance between the deck on which the lifeboat is stowed and the light draft of the vessel. For lifeboats in vessels on ocean or coastwise service, one of the painters shall have a long eye splice and be attached to the thwart with a toggle. The other painter shall be attached to the stem.

(aa) *Plug.* The automatic drain plug required in the lifeboat shall be provided with a cap or plug attached to the lifeboat by a suitable chain.

(bb) *Provisions.* Two pounds of hard bread or its approved equivalent shall be provided for each person the lifeboat is certified to carry. The provisions shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in lockers or other compartments providing suitable protection.

(cc) *Rowlocks.* A unit, consisting of sufficient rowlocks and rowlock sockets for each oar required by Table 94.20–15 (w) plus 2 additional rowlocks. The rowlocks shall be attached to the lifeboat by separate chains so as to be available for immediate use, except that the 2 additional spare rowlocks shall be carried in the equipment locker or stowed near the stern if no locker is fitted. The rowlocks and rowlock sockets shall be distributed so as to provide the maximum amount of single banked oars practicable.

(dd) *Rudder and tiller.* The rudder and tiller shall be constructed in accordance with § 160.035–3 (t) in Subpart 160.035 of Subchapter Q (Specifications) of this chapter.

(ee) *Sea anchor.* The sea anchor shall be of an approved type.

(ff) *Signals, distress, floating orange smoke.* Two approved floating orange smoke distress signals, constructed in accordance with Subpart 160.022 of Subchapter Q (Specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture.

(gg) *Signals, distress, red hand flare.* A unit, consisting of 12 approved hand red flare distress signals in a watertight container, constructed in accordance with Subparts 160.021 or 160.023 of Subchapter Q (Specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture.

(hh) *Signals, distress, red parachute flare.* A unit, consisting of 12 approved parachute red flare distress signals with an approved means of projecting them, all contained in a portable watertight container; or 12 approved hand-held rocket-propelled parachute red flare distress signals contained in a portable watertight container. Construction shall be in accordance with Subparts 160.024 or 160.036 of Subchapter Q (specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture.

(ii) *Water.* The water shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in drinking water tanks, lockers, or other compartments providing suitable protection.

§ 94.20–20 *Required equipment for life rafts.* (a) The life rafts for all vessels shall be equipped in accordance with Table 94.20–20 (a). For a description of the items contained in this table and the units comprising the items, see the applicable paragraphs of § 94.20–25. The letter identification prefixing the item in the table corresponds to the paragraph designation in § 94.20–25.

§ 94.20–25 *Description of equipment for life rafts*—(a) *Boathooks.* Boathooks shall be of the single hook ball point type. Boathook handles shall be of clear grained white ash, or equivalent, not less than 8 feet long and 1½ inches in diameter.

(b) *Drinking cups.* Drinking cups shall be enameled and provided with ⅛-inch cotton lanyards 3 feet in length.

(c) *Jackknife.* The jackknife (with can opener) shall be of an approved type, constructed in accordance with Subpart 160.043 of Subchapter Q (Specifications) of this chapter.

(d) *Life line.* The life line shall be properly secured around the sides and ends of the life raft, festooned in bights not longer than 3 feet, with a seine float in each bight. The life line shall be of a size and strength not less than 12 thread manila.

(e) *Matches.* A box of friction matches in a watertight container.

TABLE 94.20-20 (a)

Letter identification	Item identification	Ocean and coastwise	Great Lakes		Lakes, bays, and sounds; and rivers
			Vessels carrying cargo	Other vessels	
(a)	Boathook	1	1	1	1
(b)	Drinking cups	1	None	None	None
(c)	Jackknife	1	None	None	None
(d)	Life line	[1] 1	[1] 1	[1] 1	[1] 1
(e)	Matches	1	1	None	None
(f)	Mirrors, signaling	2	None	None	None
(g)	Oars	[2] 1 unit	[2] 1 unit	[2] 1 unit	[2] 1 unit
(h)	Oil, storm (gallons)	1	1	None	None
(i)	Painter	1	1	1	1
(j)	Provisions (pounds per person)	2	None	None	None
(k)	Rowlocks	[2] 1 unit	[2] 1 unit	[2] 1 unit	[2] 1 unit
(l)	Sea anchor	1	1	None	None
(m)	Signals, distress	[2] 1 unit	[2, 3] 1 unit	None	None
(n)	Water (quarts per person)	1	None	None	None
(o)	Water light	1	1	[4] 1	None

[1] Not required on type A life rafts.
[2] For description of units see §94.20-25.
[3] Smoke signals not required. Only 6 hand red flare distress signals need be provided.
[4] Required only on towing vessels of 300 gross tons and over.

(f) *Mirrors, signaling.* Signaling mirrors shall be of an approved type.

(g) *Oars.* A unit, consisting of 4 rowing oars and one steering oar not less than 8 feet in length shall be provided for life rafts for 7 persons or more. For life rafts for 6 persons or less, a unit shall consist of 2 paddles not less than 5 feet in length.

(h) *Oil, storm.* One gallon of vegetable, fish, or animal oil shall be provided in a suitable metal container so constructed as to permit a controlled distribution of oil on the water, and so arranged that it can be attached to the sea anchor.

(i) *Painter.* Painters shall be of manila rope not less than 2¾ inches in circumference and of a length not less than 3 times the distance between the deck on which the life rafts are stowed and the light draft of the vessel.

(j) *Provisions.* Two pounds of hard bread or its approved equivalent shall be provided for each person the life raft is certified to carry. The provisions shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in compartments providing suitable protection.

(k) *Rowlocks.* A unit consisting of 5 rowlocks attached to the life raft by separate chains and ready for immediate use, together with proper rowlock sockets so arranged as to provide 4 rowing positions and one steering position with the life raft floating either side up. Rowlocks and rowlock sockets are not required on life rafts for 6 persons or less.

(l) *Sea anchor.* The sea anchor shall be constructed of good quality canvas or other satisfactory material, and shall be not less than 2 feet in diameter.

(m) *Signals, distress.* A unit consisting of equipment as specified in one of the subparagraphs of this paragraph. Service use of this equipment shall be limited to 3 years from date of manufacture.

(1) Twelve approved hand red flare distress signals in a watertight container and two approved floating orange smoke distress signals, constructed in accordance with Subparts 160.021 and 160.022 of Subchapter Q (Specifications) of this chapter, or

(2) Twelve approved hand red flare distress signals in a watertight container and 12 approved hand orange smoke distress signals, constructed in accordance with Subparts 160.021 and 160.037 of Subchapter Q (Specifications) of this chapter, or

(3) Twelve approved hand combination flare and smoke distress signals, constructed in accordance with Subpart 160.023 of Subchapter Q (Specifications) of this chapter.

(n) *Water.* One quart of water shall be provided for each person the life raft is certified to carry. The water shall be packaged in hermetically sealed cans of an approved type. The cans shall be stowed in compartments providing suitable protection.

(o) *Water light.* The water light shall be of an approved type, constructed in accordance with Subparts 160.012 or 161.001 of Subchapter Q (Specifications) of this chapter. The water light shall be attached to the life raft by a 12-thread manila lanyard 3 fathoms in length.

§ 94.20-90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§90.20-5 through 94.20-25 shall be complied with insofar as the number of items of equipment and the method of stowage of the equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§94.20-5 through 94.20-25 may be continued in service so long as they are maintained in a good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements in this part.

(2) Lifeboats previously approved without automatic drain plugs shall have two plugs or caps attached to the lifeboat by separate chains.

(3) Decked lifeboats shall have no drain holes or plugs, but shall be equipped with two bilge pumps.

(4) On vessels in ocean or coastwise service, unless other approved means are provided to achieve the same purpose, 3½-inch-diameter manila grab lines shall be fitted extending from gunwale to gunwale under the keel to enable persons to cling to and climb upon the upturned lifeboat. The ends of each grab line shall be securely attached to the side benches or other permanent part of the lifeboat and each grab line shall be made up with figure eight knots spaced approximately 18 inches apart in order to provide hand grips. Means shall be provided for taking up any slack in the grab lines.

(5) Vessels required to have as lifeboat equipment 2 approved floating orange smoke signals may retain in substitution therefore either 12 approved hand orange smoke distress signals constructed in accordance with Subpart 160.037 (Specifications) of this chapter, or 12 approved combination flare and smoke distress signals constructed in accordance with Subpart 160.023 of Subchapter Q (Specifications) of this chapter. The service use of this equipment shall be limited to 3 years from date of manufacture, whereupon it shall be replaced with the required floating orange smoke signals.

SUBPART 94.25—DAVITS

§ 94.25-1 *Application.* (a) The provisions of this subpart, with the exception of § 94.25-90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.25-90.

§ 94.25-5 *General.* (a) All gravity and mechanical type davits shall be of an approved type, constructed in accordance with Subpart 160.032 of Subchapter Q (Specifications) of this chapter.

(b) Davits for lifeboats weighing in excess of 5,000 pounds when fully equipped (but without persons) shall be of the gravity type.

(c) All davits shall be so arranged that the lifeboats do not require lifting prior to being swung out, except on small vessels where such requirement is unreasonable or impracticable in the opinion of the Officer in Charge, Marine Inspection.

(d) All davits and necesary gear shall be such as to meet the requirements for the installation test set forth in Subpart 94.35. The design, arrangements, and installation shall be such as to preclude undue delay in getting the lifeboats into the water .

(e) Radial davits, where permitted, shall comply with the following requirements:

(1) They shall be fitted with means to prevent them from being jerked from their sockets.

(2) They shall maintain a factor of safety of six based on the weight of the fully equipped and loaded lifeboat, except that the weight of the fully equipped lifeboat alone may be used where the lifeboat is launched before being loaded with people.

(3) They shall be fitted with hand gear of sufficient power to insure that the boat can be turned out against a maximum list of 15 degrees.

(4) They shall be shop tested and show no permanent set or undue stress when subjected to a load equal to 2.2 times the working load. In addition, they shall be shop tested with a load equal to 1.1 times

the weight of the fully equipped lifeboat with the davit set up to simulate a 15-degree list inboard, and it shall be determined that the hand gear can adequately handle the load in this condition.

(f) Davits shall be so disposed on one or more decks as to permit the lifeboats placed under them to be safely lowered without interference from the operation of any other davits.

§ 94.25–10 *Requirements for vessels in ocean or coastwise service.* (a) All vessels shall be fitted with a set of approved gravity or mechanical davits for each lifeboat carried except that on small vessels radial type davits or other means may be used if specifically approved by the Commandant.

(b) All davit installations shall have 2 lifelines fitted to a davit span. The lifelines shall be of such length as to reach the water at the lightest sea going draft with the vessel listed 15 degrees either way.

§ 94.25–15 *Requirements for vessels in Great Lakes, lakes, bays, and sounds, or river service.* (a) All vessels shall be fitted with a set of approved gravity or mechanical davits for each lifeboat carried, except that on small vessels, radial type davits or other means may be used if specifically approved by the Commandant.

§ 94.25–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.25–5 through 94.25–15 shall be complied with insofar as the number and general type of equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 94.25–5 through 94.25–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be made to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable specifications or requirements.

(2) On vessels the keels of which were laid after September 1, 1941, all davits for lifeboats weighing in excess of 5,000 pounds when fully equipped (but without persons) shall be of the gravity type.

SUBPART 94.30—LIFEBOAT WINCHES

§ 94.30–1 *Application.* (a) The provisions of this subpart, with the exception of § 94.30–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.30–90.

§ 94.30–5 *General.* (a) All lifeboat winches shall be of an approved type, constructed in accordance with Subpart 160.015 of Subchapter Q (Specifications), of this chapter.

(b) Where ice conditions are likely to be encountered, suitable fabric covers shall be provided for all lifeboat winches, so fitted over exposed mechanism, that ice formations may be readily broken adrift when necessary to operate the winch.

(c) Where lifeboat winches are used, wire falls shall be employed.

§ 94.30–10 *Number and type required.* (a) Lifeboat winches shall be fitted for each set of davits on all vessels in ocean or coastwise service where the height of the deck on which lifeboats are carried exceeds 20 feet from the lightest seagoing draft.

(b) Lifeboat winches shall be used in all cases where gravity type davits are employed.

(c) Lifeboat winches for use with gravity davits shall have grooved drums of such size that there will be only one layer of wire on the drums. Lifeboat winches for use with mechanical davits need not have grooved drums, and may be designed to take more than one layer of wire.

§ 94.30–15 *Installation.* (a) Lifeboat winches shall be so located that the operator can observe the movement of the lifeboat during the lowering operation. In addition, any electrical controls provided shall meet the requirements of Subpart 111.65 of Subchapter J (Electrical Engineering) of this chapter.

(b) The lead of the falls to the lifeboat winches and length and size of wire shall be in accordance with Subpart 94.33.

§ 94.30–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.30–5 through 94.30–15 with the exception of § 94.30–10 (a), shall be complied with insofar as the number and general type of equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 94.30–5 through 94.30–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. However, all new installations or major replacements shall meet the applicable specifications or requirements.

(2) Existing arrangements previously approved, but not meeting the requirements of § 94.30–15 (a), need not be changed. However, new installations or major alterations should conform with such requirements where reasonable and practicable.

(3) Where lifeboat winches are used with gravity davits, the installation shall comply with the requirements contained in § 160.015–3 (k) of Subpart 160.015 of Subchapter Q (Specifications) of this chapter for lifeboat winches.

SUBPART 94.33—BLOCKS AND FALLS

§ 94.33–1 *Application.* (a) The provisions of this subpart, with the exception of § 94.33–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.33–90.

§ 94.33–5 *General.* (a) All blocks, falls, fairleads, padeyes, shackles, links, fastenings, etc., used in connection with lifeboat gear shall be designed with a minimum factor of safety of six, based on the maximum working load.

(b) Falls shall be of such length that the lifeboat may be lowered to the water with the vessel at its lightest draft and listed 15 degrees.

(c) Falls, where exposed and subject to damage or fouling, shall be suitably protected.

(d) Such blocks or other fittings shall be fitted as are necessary to permit the falls to lead fair in all positions of the davits.

(e) Means for lubrication shall be provided for all moving parts of blocks, sheaves, fairleads, etc.

§ 94.33–10 *Installations where lifeboat winches are used.* (a) All falls shall be of wire rope.

(b) Wire rope falls of 6 x 19 regular lay filler wire construction, prelubricated at the factory with suitable neutral wire rope lubricant, shall be accepted as standard. Any other wire rope, superior or equal to this minimum standard may be used if specifically approved.

(c) Not more than two-part falls may be used, except in special cases where three-part falls may be permitted by the Commandant.

(d) The lead sheaves to the drums shall be located so as to provide fleet angles of not more than 8 degrees for grooved drums and not more than 4 degrees for nongrooved drums. By fleet angle is meant the angle included between an imaginary line from the lead sheave perpendicular to the axis of the drum and the line formed by the wire rope when led from the lead sheave to either extremity of the drum.

(e) Sheaves shall have a diameter at the base of the groove at least equal to 12 times the diameter of the wire rope.

§ 94.33–15 *Installations where lifeboat winches are not used.* (a) All falls shall be of manila rope or equivalent. Wire rope may not be used.

(b) All vessels of over 1,000 gross tons shall be provided with covered tubs, boxes, or reels for the stowage and protection of the falls, and cruciform bitts shall be provided for properly lowering the lifeboats. Vessels of 1,000 gross tons and less shall have the falls protected from ice and ready for immediate use, and shall be provided with suitable lowering bitts or cleats.

(c) There shall be ample clearance between the cheeks of all blocks. The width between the cheeks shall be ½ inch greater than the diameter of new rope when rope of 3¾ inches circumference or greater is used. Blocks for smaller rope shall be designed with proportional clearances.

§ 94.33–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.33–5 through 94.33–15, as applicable, shall be complied with insofar as

the general type of equipment is concerned. Existing equipment previously approved, but not meeting the detailed requirements of §§ 94.33–5 through 94.33–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be made to the same standards as the original installation. However, all new installations or major replacements shall meet the applicable requirements.

SUBPART 94.35—INSTALLATION OF LIFEBOATS, DAVITS, AND WINCHES

§ 94.35–1 *Application.* (a) The provisions of this subpart shall apply to all installations contracted for on or after November 19, 1952, except as set forth in § 97.15–45 (c) of this subchapter.

§ 94.35–5 *Tests and examinations.* (a) Upon completion of installation of lifeboats, davits, or winches, tests and examinations as required by this section shall be made to the satisfaction of the inspector before the vessel may be navigated.

(b) The lifeboat shall be swung out from the chocks and lowered to the embarkation deck. At this point the lifeboat shall be loaded with deadweight equivalent to the number of persons allowed (165 pounds per person) together with weight of equipment, plus 10 percent of the total load including the weight of the lifeboat. No persons shall be permitted in the lifeboat while it is being loaded or lowered. The lifeboat shall then be lowered to the water and disengaged from the falls.

(1) None of the equipment or parts thereof nor deck connections shall show signs of permanent set or excessive deflection.

(2) Mechanical and radial type davits shall be capable of being swung out without lifting the lifeboat, except on small vessels where such requirement is unreasonable or impracticable in the opinion of the Officer in Charge, Marine Inspection.

(3) The falls shall be of sufficient length to lower the lifeboat to the light load line with the vessel heeled 15 degrees inboard.

(4) Where lifeboat winches are used, the following additional determinations shall be made:

(i) During lowering, the lifeboat shall be stopped at intervals of approximately six feet by the action of the counterweight alone. The counterweight shall be capable of stopping and holding the lifeboat. The brake action shall be smooth, but positive.

(ii) Brakes exposed to the weather shall be tested under the load conditions with the braking surfaces both wet and dry.

(iii) The governor brake shall be capable of controlling the speed of lowering of the fully equipped lifeboat with its complement of persons on board to not more than 120 feet per minute. In addition, the speed of lowering of the fully equipped lifeboat without its complement of persons shall be not less than 40 feet per minute.

SUBPART 94.40—LIFE PRESERVERS

§ 94.40–1 *Application.* (a) The provisions of this subpart, with the exception of § 94.40–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.40–90.

§ 94.40–5 *General.* (a) All life preservers shall be of an approved type, constructed in accordance with Subparts 160.002 through 160.005 of Subchapter Q (Specifications) of this chapter.

§ 94.40–10 *Number required.* (a) All vessels shall be provided with a life preserver for each person on board.

§ 94.40–15 *Distribution and stowage*—(a) *Distribution.* (1) Life preservers shall be properly distributed throughout the crew quarters and other readily accessible places. If passengers are carried in addition to the crew, the additional life preservers shall be placed in the staterooms, berthings, and other places convenient for the passengers.

(b) *Stowage.* (1) Lockers, boxes, and closets in which life preservers are stowed shall not be capable of being locked, shall be plainly marked, and the life preservers contained therein shall be readily available.

(2) Life preservers stowed overhead shall be so supported that they can be quickly released and distributed. Where life preservers are stowed at a height greater than 7 feet from the deck below, efficient means shall be provided for their immediate release and distribution to be operated by persons standing on the deck.

§ 94.40–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.40–5 through 94.40–15 shall be complied with insofar as the number of items of equipment and the method of stowage is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 94.40–5 through 94.40–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements in this subpart.

SUBPART 94.43—RING LIFE BUOYS AND WATER LIGHTS

§ 94.43–1 *Application.* (a) The provisions of this subpart, with the exception of § 94.43–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.43–90.

§ 94.43–5 *General.* (a) All ring life buoys shall be of an approved type, constructed in accordance with Subpart 160.009 of Subchapter Q (Specifications) of this chapter.

(b) All water lights shall be of an approved type, constructed in accordance with Subparts 160.012 or 161.001 of Subchapter Q (Specifications) of this chapter.

§ 94.43–10 *Number required.* (a) The minimum number of approved 30-inch ring life buoys, and the minimum number of which shall have water lights attached, shall be in accordance with Table 94.43–10 (a).

TABLE 94.43–10 (a)

Length of vessel in feet	Ocean		All services other than ocean [1]	
	Minimum number of ring life buoys	Minimum number of ring life buoys in column 2 which shall have water lights attached	Minimum number of ring life buoys	Minimum number of ring life buoys in column 4 which shall have water lights attached
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5
Under 100	8	6	2	[illegible]
100 and under 200	8	6	[illegible]	2
200 and under 300	8	6	6	[illegible]
300 and under 400	12	6	12	[illegible]
400 and under 600	18	9	18	9
600 and under 800	24	12	24	12
800 and over	30	15	30	15

[1] Any mechanically propelled vessel on an international voyage shall meet the requirements for ocean service.

(b) One of the ring life buoys with water light attached on each side of the vessel shall have secured to it a line at least 15 fathoms in length.

§ 94.43–15 *Distribution and securing.* (a) All ring life buoys shall be placed so as to be readily accessible to the persons on board, and their positions plainly indicated so as to be known to the persons concerned.

(b) The ring life buoys shall always be capable of being cast loose, and shall not be permanently secured in any way.

§ 94.43–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.43–5 through 94.43–15 shall be complied with insofar as the number of items of equipment and the method of stowage is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements set forth in §§ 94.43–5 through 94.43–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements in this subpart.

SUBPART 94.45—LINE-THROWING APPLIANCES

§ 94.45–1 *Application.* (a) The provisions of this subpart with the exception of § 94.45–90, shall apply to all vessels of 150 gross tons and over in ocean or coastwise service. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.45–90.

§ 94.45–5 *General.* (a) Line-throwing appliances of the impulse-projected rocket type, and the equipment auxiliary thereto, shall be of an approved type, constructed in accordance with Subpart 160.040 of Subchapter Q (Specifications) of this chapter. The service use of rockets shall be limited to 4 years from date of manufacture.

(b) Line-throwing appliances of the shoulder-gun type, and the equipment auxiliary thereto, shall be of an approved type, constructed in accordance with Subpart 160.031 of Subchapter Q (Specifications) of this chapter.

§ 94.45–10 *Type required.* (a) All vessels shall be fitted with an approved line-throwing appliance of the impulse-projected rocket type. However, vessels of less than 500 gross tons and not on an international voyage may substitute a line-throwing appliance of the shoulder-gun type.

§ 94.45–15 *Equipment for line-throwing appliances.* (a) The equipment enumerated in this paragraph shall be carried for impulse-projected rocket type line-throwing appliances. Except as noted, the equipment and the appliance shall be stowed together in a suitable case or box:

(1) Four rockets, two of which shall be of the buoyant type.

(2) Four primer-ejector cartridges.

(3) Four service lines, each 1,000 feet in length, of 7/32 inch to 9/32 inch diameter, of flax or manila, and having a breaking strength of at least 500 pounds. To be kept in faking boxes or on reels. These lines may be kept either in the box or case with the remainder of the equipment, or be stowed in an accessible location nearby.

(4) One cleaning brush, one can of oil, and twelve wiping patches.

(5) One set of instructions furnished by the manufacturer.

(6) One auxiliary line, 1,500 feet of 3-inch circumference manila. This line may be kept either in the box or case with the remainder of the equipment or be stowed in an accessible location nearby.

(b) The equipment enumerated in this paragraph shall be carried for shoulder-gun-type line-throwing appliances. Except as noted, the equipment and the appliance shall be stowed together in a suitable case or box.

(1) Ten service projectiles.

(2) Twenty-five cartridges.

(3) Four service lines, each 400 feet in length, of 3/8 inch circumference flax or cotton and having a breaking strength of at least 250 pounds. To be kept in faking boxes or on reels. These lines may be kept either in the box or case with the remainder of the equipment or be stowed in an accessible location nearby.

(4) One cleaning rod with brush, one can of oil, and twelve wiping patches.

(5) One set of instructions furnished by the manufacturer.

(6) One auxiliary line, 500 feet of 3 inch circumference manila.

§ 94.45–20 *Accessibility.* (a) The line-throwing appliance and its equipment shall be kept easily and readily accessible and ready for use. No part of this equipment shall be used for any other purpose.

§ 94.45–25 *Service recommendations.* (a) In firing the line-throwing appliances, the operating instructions and safety precautions furnished by the manufacturer should be followed.

§ 94.45–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels of 150 gross tons and over in ocean or coastwise service contracted for prior to November 19, 1952, shall meet the requirements set forth in §§ 94.45–5 through 94.45–25. However, if a Lyle gun-type line-throwing appliance is already in service on such vessel, it may be continued in use so long as it is in good and serviceable condition, but may not be replaced by a similar installation. Where Lyle guns are used, the following requirements shall be met:

(1) The equipment enumerated in this subparagraph shall be carried for Lyle gun type line-throwing appliances. The equipment and the gun shall be stowed together in a suitable case or box. If the case or box does not meet the requirements of Subpart 160.038 of Subchapter Q (Specifications) of this chapter for portable magazine chest, the powder and primers shall be separately stowed in a chest meeting such requirement.

(i) Six service projectiles.

(ii) Eighteen bags (2½ ounces each) of black powder marked "One-half normal charge for Lyle gun, 2½ ounces black powder" in a nonferrous metal screw-top container.

(iii) One approved firing attachment with accessories consisting of lanyard, wrench, washer to fit between barrel and shoulder of firing attachment, blank plug for screwing into gun when firing attachment is not in place, cartridge extractor, and 25 primers in a watertight metal box.

(iv) Twenty-five paper wads.

(v) Four service lines, each 1,700 feet in length, of 7/32-inch to 9/32-inch diameter flax or manila, and having a breaking strength of at least 500 pounds, to be kept in faking boxes or on reels.

(vi) One ram rod, 1 wire brush, 1 can of light petrolatum, and 12 wiping patches.

(vii) One tapered wooden plug for muzzle of gun when not in use.

(viii) One set of instructions furnished by the manufacturer of the gun, together with a copy of the service recommendations set forth in Section 94.45–90 (c).

(ix) One auxiliary line, 1,500 feet of 3-inch circumference manila.

(2) Accessibility. Same as § 94.45–20.

SUBPART 94.50—EMBARKATION AIDS

§ 94.50–1 *Application.* (a) The provisions of this subpart, with the exception of § 94.50–90, shall apply to all vessels other than yachts and fishing vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 94.50–90.

§ 94.50–5 *Ladders—(a) Vessels in ocean or coastwise service.* (1) All ladders required by this paragraph shall be of an approved type, constructed in accordance with Subpart 160.017 of Subchapter Q (Specifications) of this chapter.

(2) All vessels shall have an approved type ladder for each set of lifeboat davits. Such ladders shall be kept ready and convenient for use on the lifeboat deck, and shall reach from such deck to the vessel's light water line, no heel assumed.

(3) All vessels which normally employ a pilot shall have an approved type ladder for the use of the pilot in addition to the ladders required by subparagraph (2) of this paragraph.

§ 94.50–10 *Illumination for lifeboat launching operations.* (a) Provisions shall be made on all vessels on an international voyage of 500 gross tons and over, and all other vessels where the lifeboat deck is more than 30 feet above the light water line, for readily and continuously available illumination from the vessel of lifeboats when alongside and in process of or immediately after being launched. Details of the illuminating system shall be in accordance with Subchapter J (Electrical Engineering) of this chapter.

§ 94.50–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of §§ 94.50–5 through 94.50–10 shall be complied with insofar as the number of items of equipment and the method of stowage is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications or requirements of §§ 94.40–5 through 94.50–10 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. All new installations or replacements shall meet the applicable specifications or requirements.

(2) The illumination for lifeboat launching operations need not meet the detailed requirements of Subchapter J (Electrical Engineering) of this chapter.

SUBPART 94.55—PORTABLE RADIO APPARATUS

§ 94.55–1 *Required on international voyage.* (a) All vessels on international voyage of 500 gross tons and over, other than yachts and fishing vessels, carrying less than 20 lifeboats shall be provided with a portable radio apparatus complying with the requirements of the Federal Communications Commission unless at least one lifeboat on each side of the vessel is fitted with a fixed radio installation. The apparatus shall be so designed that it may be used by an unskilled person. Such apparatus shall be kept in the radio room, chart room, or other suitable location ready to be moved to one or other of the lifeboats in the event of an emergency.

SUBPART 94.90—SHIP'S DISTRESS SIGNALS

§ 94.90–1 *Application.* (a) The provisions of this subpart shall apply to all

vessels of 150 gross tons and over as specifically noted.

§ 94.90–5 *Vessels in ocean or coastwise service.* (a) All vessels shall carry within the pilothouse or on the navigator's bridge, 12 approved hand-held rocket-propelled parachute red flare distress signals contained in a portable watertight container, constructed in accordance with Subpart 160.036 of Subchapter Q (Specifications) of this chapter. Service use of the distress signals shall be limited to a period of 3 years from date of manufacture.

§ 94.90–10 *Vessels in Great Lakes service.* (a) All vessels shall carry within the pilothouse or on the navigator's bridge, 12 approved hand-held red flare distress signals contained in a portable watertight container, constructed in accordance with Subparts 160.021 or 160.023 of Subchapter Q (Specifications) of this chapter. Service use of the distress signals shall be limited to a period of 3 years from date of manufacture.

PART 95—FIRE PROTECTION EQUIPMENT

Part 95 is amended to read as follows:

SUBPART 95.01—APPLICATION

Sec.
95.01–1 General.
95.01–5 Equipment installed but not required.

SUBPART 95.05—FIRE DETECTING AND EXTINGUISHING EQUIPMENT, WHERE REQUIRED

95.05–1 Fire detecting, manual alarm, and supervised patrol systems.
95.05–5 Fire main system.
95.05–10 Fixed fire extinguishing systems.
95.05–15 Hand portable fire extinguishers and semiportable fire extinguishing systems.
95.05–20 Sand.

SUBPART 95.10—FIRE MAIN SYSTEM, DETAILS

95.10–1 Application.
95.10–5 Fire pumps.
95.10–10 Fire hydrants and hose.
95.10–15 Piping.
95.10–90 Installations contracted for prior to November 19, 1952.

SUBPART 95.13—STEAM SMOTHERING SYSTEM, DETAILS

95.13–1 Application.
95.13–5 Quantity of steam required.
95.13–10 Piping.
95.13–90 Installations contracted for prior to November 19, 1952.

SUBPART 95.15—CARBON DIOXIDE EXTINGUISHING SYSTEMS, DETAILS

95.15–1 Application.
95.15–5 Quantity, pipe sizes, and discharge rates.
95.15–10 Controls.
95.15–15 Piping.
95.15–20 Carbon dioxide storage.
95.15–25 Discharge outlets.
95.15–30 Alarms.
95.15–35 Enclosure openings.
95.15–40 Pressure relief.
95.15–90 Installations contracted for prior to November 19, 1952.

SUBPART 95.17—FOAM EXTINGUISHING SYSTEMS, DETAILS

95.17–1 Application.
95.17–5 Quantity of foam required.
95.17–10 Controls.
95.17–15 Piping.
95.17–20 Discharge outlets.
95.17–25 Additional protection required.
95.17–90 Installations contracted for prior to November 19, 1952.

SUBPART 95.20—WATER SPRAY EXTINGUISHING SYSTEM, DETAILS

95.20–1 Application.
95.20–5 Capacity.
95.20–10 Controls.
95.20–15 Piping.
95.20–20 Discharge outlets.
95.20–25 Additional protection required.
95.20–90 Installations contracted for prior to November 19, 1952.

SUBPART 95.50—HAND PORTABLE FIRE EXTINGUISHERS AND SEMIPORTABLE FIRE EXTINGUISHING SYSTEMS, ARRANGEMENTS AND DETAILS

95.50–1 Application.
95.50–5 Classification.
95.50–10 Location.
95.50–15 Spare charges.
95.50–90 Vessels contracted for prior to November 19, 1952.

SUBPART 95.60—FIRE AXES

95.60–1 Application.
95.60–5 Number required.
95.60–10 Location.

AUTHORITY: §§ 95.01–1 to 95.60–10 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4470, 4471, 4477, 4479, and 4483, as amended, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 463, 464, 470, 472, 476, 367, 526p, 463a, 50 U. S. C. App. 1275.

SUBPART 95.01—APPLICATION

§ 95.01–1 *General.* (a) The provisions of this part shall apply to all vessels except as specifically noted in this part.

§ 95.01–5 *Equipment installed but not required.* (a) Where fire detecting or extinguishing systems or equipment are not required, but are installed, the system or equipment and its installation shall meet the requirements of this part.

SUBPART 95.05—FIRE DETECTING AND EXTINGUISHING EQUIPMENT, WHERE REQUIRED

§ 95.05–1 *Fire detecting, manual alarm, and supervised patrol systems.* (a) Fire detecting, manual alarm, and supervised patrol systems are not required, but if installed, the systems shall meet the applicable requirements of Part 76 of Subchapter H (Passenger Vessels) of this chapter.

§ 95.05–5 *Fire main system.* (a) Fire pumps, hydrants, hose, and nozzles shall be installed on all vessels other than barges.

(b) The arrangements and details of the fire main system shall be as set forth in Subpart 95.10.

§ 95.05–10 *Fixed fire extinguishing systems.* (a) Approved fixed fire extinguishing systems shall be installed on all vessels other than yachts, fishing vessels, and barges in the following locations:

(1) A fixed carbon dioxide or steam smothering system shall be installed in all cargo compartments and tanks for combustible cargo, except that vessels engaged exclusively in the carriage of coal or grain in bulk need not be fitted with such system. In lieu of the carbon dioxide or steam smothering systems, the following systems may be used or required in special cases:

(i) A fixed foam system may be used in cargo tanks.

(ii) In cases where a cargo compartment is normally accessible and is considered to be a part of the working or living quarters, a water sprinkling system may be required, and the details of such system will be subject to special approval.

(2) A fixed carbon dioxide or steam smothering system shall be installed in all lamp and paint lockers, oil rooms, and similar spaces.

(3) On vessels of 1,000 gross tons and over, contracted for on or after November 19, 1952, or where conversion from coal to oil is contracted for on or after November 19, 1952, a fixed carbon dioxide, foam, or water spray system shall be installed in all spaces containing oil fired boilers, either main or auxiliary, or their fuel oil units, valves, or manifolds in the line between the settling tanks and the boilers.

(4) If a fixed fire extinguishing system is installed to protect an internal combustion propelling machinery installation, the system shall be of the carbon dioxide type.

(5) On vessels contracted for on or after November 19, 1952, where an inclosed ventilating system is installed for electric propulsion motors or generators, a fixed carbon dioxide extinguishing system shall be installed in such system.

(b) The arrangements and details of the fixed fire extinguishing systems shall be as set forth in Subparts 95.13 through 95.20.

§ 95.05–15 *Hand portable fire extinguishers and semiportable fire extinguishing systems.* (a) Approved hand portable fire extinguishers and semiportable fire extinguishing systems shall be installed on all vessels, other than fishing vessels, as set forth in Subpart 95.50.

§ 95.05–20 *Sand.* (a) On vessels of over 1,000 gross tons there shall be in each space containing oil fired boilers a metal receptacle containing not less than 10 cubic feet of sand, sawdust impregnated with soda, or other approved dry materials together with a scoop or shaker for distributing the same. On vessels of 1,000 gross tons or less, at least 5 cubic feet of such materials shall be similarly carried.

SUBPART 95.10—FIRE MAIN SYSTEM, DETAILS

§ 95.10–1 *Application.* (a) The provisions of this subpart, with the exception of § 95.10–90, shall apply to all fire main installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 95.10–90.

§ 95.10–5 *Fire pumps.* (a) Vessels shall be equipped with independently driven fire pumps in accordance with Table 95.10–5 (a).

TABLE 95.10–5 (a)

Gross tons		Minimum number of pumps	Hose and hydrant size, inches	Nozzle orifice size, inches	Length of hose, feet
Over	Not over				
---	100	[1] 1	[1] 1½	[1] ½	[1] 50
100	1,000	1	1½	⅝	50
1,000	1,500	2	1½	⅝	50
1,500	-----	2	[2] 2½	[2] ⅞	[2] 50

[1] On vessels of 65 feet in length or less, ¾-inch hose of good commercial grade together with a commercial garden hose nozzle may be used. The pump may be hand operated and the length of hose shall be sufficient to assure coverage of all parts of the vessel.

[2] 75 feet of 1½-inch hose and 1⅛-inch nozzle may be used where specified by § 95.10–10 (b) for interior locations and 50 feet of 1½-inch hose may be used in exterior locations on vessels in other than ocean or coastwise service.

(b) Vessels on an international voyage shall have a minimum total fire pump capacity at least equal to ⅔ of the required total bilge pump capacity, but in no case less than that required by this section.

(c) Each pump shall be capable of delivering water simultaneously from the two highest outlets at a Pitot tube pressure of approximately 50 p. s. i. Where 1½-inch hose is permitted in lieu of 2½-inch hose by footnote 2 of Table 95.10–5 (a), the pump capacity shall be determined on the same basis as if 2½-inch hose had been permitted. Where ¾-inch hose is permitted by Table 95.10–5 (a), the Pitot tube pressure need be only 35 p. s. i.

(d) Fire pumps shall be fitted on the discharge side with relief valves set to relieve at 25 p. s. i. in excess of the pressure necessary to maintain the requirements of paragraph (c) of this section or 125 p. s. i., whichever is greater. Relief valves may be omitted if the pumps, operating under shut-off conditions, are not capable of developing a pressure exceeding this amount.

(e) Fire pumps shall be fitted with a pressure gage on the discharge side of the pumps.

(f) Fire pumps may be used for other purposes provided at least one of the required pumps is kept available for use on the fire system at all times. Unless specifically approved by the Commandant, no branch lines shall be connected to the fire mains for other than fire and deck wash purposes. Other discharge lines shall lead from a discharge manifold near the fire pump. In no case shall a pump having connection to an oil line be used as a fire pump.

(g) The total area of the pipes leading from a pump shall not be less than the discharge area of the pump.

(h) On vessels with oil fired boilers, either main or auxiliary, or with internal combustion propulsion machinery, where 2 fire pumps are required, they shall be located in separate spaces, and the arrangement of pumps, sea connections, and sources of power shall be such as to insure that a fire in any one space will not put all of the fire pumps out of operation. However, where it is shown to the satisfaction of the Commandant that it is unreasonable or impracticable to meet this requirement due to the size or arrangement of the vessel, or for other reasons, the installation of a total flooding carbon dioxide system may be accepted as an alternate method of extinguishing any fire which would affect the powering and operation of at least one of the required fire pumps.

§ 95.10–10 *Fire hydrants and hose.* (a) The size of fire hydrants, hose, and nozzles and the length of hose required shall be as noted in Table 95.10–5 (a).

(b) In lieu of the 2½-inch hose and hydrants specified in Table 95.10–5 (a), on vessels over 1,500 gross tons, the hydrants in interior locations may have siamese connections for 1½-inch hose. In these cases the hose shall be 75 feet in length, and only one hose will be required at each fire station; however, if all such stations can be satisfactorily served with 50-foot lengths, 50-foot hose may be used.

(c) On vessels over 1,000 gross tons there shall be at least one shore connection to the fire main available to each side of the vessel in an accessible location. Suitable cut-out valves and check valves shall be provided, and adapters shall, if practicable, be available where necessary to provide the shore connections with coupling threads corresponding to the shore fire lines.

(d) Fire hydrants shall be of sufficient number and so located that any part of the vessel, other than main machinery spaces, accessible to persons on board while the vessel is being navigated and all cargo holds may be reached with at least 2 streams of water from separate outlets, at least one of which shall be from a single length of hose. In main machinery spaces, all portions of such spaces shall be capable of being reached by at least 2 streams of water, each of which shall be from a single length of hose from separate outlets; however, this requirement need not apply to shaft alleys containing no assigned space for the stowage of combustibles. Fire hydrants shall be numbered as required by § 97.37–15 of this subchapter.

(e) All parts of the fire main located on exposed decks shall either be protected against freezing or be fitted with cut-out valves and drain valves so that the entire exposed parts of such piping may be shut off and drained in freezing weather. Except when closed to prevent freezing, such valves shall be sealed open.

(f) The outlet at the fire hydrant shall be limited to any position from the horizontal to the vertical pointing downward, so that the hose will lead horizontally or downward to minimize the possibility of kinking.

(g) Each fire hydrant shall be provided with a single length of hose with nozzle attached and a spanner. A suitable hose rack or other device shall be provided for the proper stowage of the hose. If the hose is not stowed in the open or behind glass so as to be readily seen, the enclosure shall be marked in accordance with § 97.37–15 of this subchapter.

(h) Fire hose shall be connected to the outlets at all times. However, on open decks where no protection is afforded to the hose in heavy weather, or where the hose may be liable to damage from the handling of cargo, the hose may be temporarily removed from the hydrant and stowed in an accessible nearby location.

(i) Hose nozzles shall be as follows:

(1) All nozzles shall be of good grade bronze or equivalent metal.

(2) Where smooth bore type nozzles are used, they shall have an orifice of the size indicated in Table 95.10–5 (a).

(3) Where combination nozzles are used, they shall be approved, and shall be capable of producing a solid stream, a high velocity fog spray, or being shut off. In addition, an approved applicator equipped with a low velocity water fog tip, which is capable of being attached directly to the nozzle or the hose, shall be provided for each nozzle. The detachable applicator shall be stowed adjacent to the fire hydrant, except where such combination nozzles are not required, in which case the applicator may be stowed at the discretion of the master. Unless a self-cleaning strainer is contained with the nozzle itself, and within the applicator where the applicator is attached directly to the hose, there shall be a self-cleaning strainer attached to the fire hydrant either directly or by means of a short length of hose.

(4) Except as noted in subparagraphs (5) and (6) of this paragraph, all hose nozzles shall be of either the smooth bore type or the approved type combination nozzle.

(5) On all vessels of 1,000 gross tons and over, the hose attached to the hydrants in propulsion machinery spaces containing oil fired boilers, internal combustion machinery, or oil fuel units shall be fitted with an approved combination nozzle. The applicator shall be not more than 6 feet in length.

(6) Where ¾-inch hose is permitted by Table 95.10–5 (a), a good commercial grade garden hose nozzle or equivalent will be accepted.

(7) Where approved combination nozzles are used, but are not required, the applicators with low velocity fog spray heads and the self-cleaning strainers may be fitted, but will not be required.

(k) Fire hydrants, nozzles, and other fittings shall have threads to accommodate the hose connections noted in paragraph (i) of this section.

(l) Fire hose and couplings shall be as follows:

(1) Couplings shall be of brass, bronze, or other equivalent metal. National Standard Hose Threads shall be used for the 1½ and 2½ inch sizes, i. e., 11½ threads per inch for 1½-inch hose and 7½ threads per inch for 2½-inch hose.

(2) Unlined hose shall not be used in the machinery spaces.

(3) Where ¾-inch hose is permitted by Table 95.10–5 (a), the hose and couplings shall be of good commercial grade.

§ 95.10–15 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All distribution cut-off valves shall be marked as required by § 97.37–10 of this subchapter.

§ 95.10–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Except as specifically modified by this paragraph, the requirements of

§§ 95.10–5 through 95.10–15 shall be complied with insofar as the number and general type of equipment is concerned. Existing equipment previously approved, but not meeting the applicable requirements of §§ 95.10–5 through 95.10–15 may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs, alterations, and replacements may be permitted to the same standards as the original installations. However, all new installations or major replacements shall meet the applicable requirements in this subpart.

(2) All vessels shall be fitted with fire pumps, hoses, and nozzles in accordance with Table 95.10–90 (a) (2).

TABLE 95.10–90 (a) (2)

Gross tons		Minimum number of pumps	Minimum hose and hydrant size, inches	Nozzle orifice size, inches	Length of hose, feet
Over	Not over				
--	100	I	[1] 1½	[1] 13/16	[1] 50
100	1,000	II	[2] 1½	[2] 15/16	[2] 50
1,000	-----	III	[2] 1½	[2] 15/16	[2] 50

[1] On vessels of 65 feet in length or less, ¾-inch hose of good commercial grade together with a commercial garden hose nozzle may be used. The pump may be hand operated and the length of hose shall be sufficient to assure coverage of all parts of the vessel.

[2] May use 50 feet of 2½-inch hose with 7/8-inch nozzles for exterior stations. 75 feet of 1½-inch hose with 13/16-inch nozzles may be used for interior station in which case such interior stations shall have siamese connections.

(3) Vessels contracted for prior to July 1, 1935, need not meet the requirements of § 95.10–5 (h), and vessels contracted for on or after July 1, 1935, but prior to November 19, 1952, may have a carbon dioxide "bilge" in lieu of "total flooding" system. However, in vessels of both categories where a conversion from coal to oil is contracted for on or after November 19, 1952, the provisions of § 95.10–5 (h) shall apply.

(4) The general requirements of §§ 95.10–5 (c) through (g), 95.10–10 (d) through (i), and 95.10–15 shall be complied with insofar as is reasonable and practicable.

SUBPART 95.13—STEAM SMOTHERING SYSTEM, DETAILS

§ 95.13–1 *Application.* (a) Where a steam smothering system is installed, the provisions of this subpart, with the exception of § 95.13–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 95.13–90.

§ 95.13–5 *Quantity of steam required.* (a) Steam shall be available from main or auxiliary boilers to provide at least 1 pound of steam per hour for each 12 cubic feet of the gross volume of the largest compartment to be protected.

(b) Although separate piping shall be led to each cargo hold and tween deck, for the purpose of determining the amount of steam required, a cargo compartment will be considered as the space between adjacent watertight bulkheads and from tank top or lowest deck to the deck head of the uppermost deck on which cargo may be carried. If a trunk extends beyond such deck, the trunk space shall be included. Tonnage openings shall be considered as sealed for this purpose.

(c) A steam pressure of at least 100 p. s. i. shall be available unless specifically approved otherwise.

§ 95.13–10 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) The distribution piping shall emanate from not more than three stations in easily accessible locations on the weather deck, and shall lead to the lower portion of each cargo hold, cargo tween deck, and other compartments protected. However, lines to paint lockers and similar small spaces may be taken from the nearest steam supply line.

(c) The distribution line to each compartment shall be fitted with a shut-off valve. The valve shall be marked as required by § 97.37–10 of this subchapter.

(d) The manifold steam supply line shall be fitted with a master valve at the manifold.

(e) Provisions shall be made for draining the manifold and distribution lines to prevent them from freezing.

(f) If located on the open deck, the distribution manifolds shall be suitably protected by an enclosing cabinet or casing. In any case, it shall be marked as required by § 97.37–13 of this subchapter.

(g) Piping shall not be led into or through spaces accessible to the persons on board while the vessel is being navigated, with the exception of machinery spaces and corridors. However, in special cases, arrangements to run piping through such spaces may be specifically approved by the Commandant, provided all joints are welded, suitable expansion bends are provided, and all piping is extra heavy.

(h) Piping shall be used for no other purposes except that it may be incorporated with the fire-detecting system, if installed, and where suitable provisions are made, it may be used for steaming out tanks.

(i) The minimum size and number of branches to the various spaces shall be as given in Table 95.13–10 (i). The distribution piping from the manifold to the branch lines shall have an area approximately equal to the combined areas of the branch lines served.

TABLE 95.13–10 (i)

Volume of space in cubic feet		Number of branches to space	Pipe size of each branch, inches
Over	Not over		
-------	500	1	¾
500	5,000	I	1
5,000	15,000	1	1¼
15,000	30,000	1	1½
30,000	60,000	2	1½
60,000	100,000	3	1½
100,000	190,000	4	1½

(j) The steam supply line from the boiler to any distribution manifold shall be of sufficient size to supply all the branch lines to the largest compartment and to all adjacent compartments.

§ 95.13–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to July 1, 1935, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original installation.

(2) The main pipes and their branches to the cargo compartments and similar spaces shall be not less than 1½-inch pipe size and shall emanate from not more than two stations in easily accessible locations. If located on the open deck, the distribution manifolds shall be suitably protected by an enclosing cabinet or casing which shall be marked as required by § 97.37–13 of this subchapter. Each branch line shall have a valve at the manifold which shall be marked as required by § 97.37–10 of this subchapter.

(3) Branches to paint lockers and similar small spaces may be taken from the nearest steam supply line and shall be not less than ¾-inch pipe size. The valve shall be marked as required by § 97.37–10 of this subchapter.

(b) Installations contracted for on or after July 1, 1935, but prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials and facilities previously approved will be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standard as the original installation.

(2) Steam shall be available from the main or auxiliary boilers to provide at least one pound of steam per hour for each 50 cubic feet of gross volume of the largest compartment protected. Where reasonable and practicable, the steam pressure shall be at least 100 p. s. i.

(3) The piping system shall meet the general requirements of § 95.13–10 (a) through (h) insofar as is reasonable and practicable.

(4) The minimum size of distribution piping and the number of branches to the various spaces shall be as given in Table 95.13–90 (b) (4) or by the following formula:

$$D=\sqrt{\frac{C}{30.000}} \qquad (1)$$

where:

D = Required diameter of pipe in inches.
C = Volume of compartment in cubic feet.

TABLE 95.13–90 (b) (4)

Volume of compartment in cubic feet		Number of branches to compartment	Pipe size in each branch, inches
Over	Not over		
-------	30,000	1	1
30,000	46,000	I	1¼
46,000	67,000	II	1½
67,000	94,000	2	1¼
94,000	135,000	2	1½
135,000	203,000	3	1½

(5) The minimum size of the steam supply line from the boiler to the distribution manifold shall be as given by the following formula:

$$D=\sqrt{\frac{C}{60{,}000}} \qquad (2)$$

where:

D = Diameter of pipe in inches.
C = Volume of all compartments in cubic feet.

SUBPART 95.15—CARBON DIOXIDE EXTINGUISHING SYSTEMS, DETAILS

§ 95.15–1 *Application.* (a) Where a carbon dioxide extinguishing system is installed, the provisions of this subpart, with the exception of § 95.15–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 95.15–90.

(b) The requirements of this subpart are based on a "high pressure system," i. e., one in which the carbon dioxide is stored in liquid form at atmospheric temperature. Details for "low pressure systems," i. e., those in which the carbon dioxide is stored in liquid form at a continuously controlled low temperature, may be specifically approved by the Commandant where it is demonstrated that a comparable degree of safety and fire extinguishing ability is achieved.

§ 95.15–5 *Quantity, pipe sizes, and discharge rates.* (a) *General.* The amount of carbon dioxide required for each space shall be as determined by paragraphs (b) through (e) of this section.

(b) *Total available supply.* A separate supply of carbon dioxide need not be provided for each space protected. The total available supply shall be at least sufficient for the space requiring the greatest amount.

(c) *Cargo spaces.* (1) The number of pounds of carbon dioxide required for each space shall be equal to the gross volume of the space in cubic feet divided by 30.

(2) Although separate piping shall be led to each cargo hold and 'tween deck, for the purpose of determining the amount of carbon dioxide required, a cargo compartment will be considered as the space between watertight or fire-screen bulkheads and from the tank top or lowest deck to the deck head of the uppermost space on which cargo may be carried. If a trunk extends beyond such deck, the trunk volume shall be included. Tonnage openings shall be considered as sealed for this purpose.

(3) Branch lines to the various cargo holds and 'tween decks shall not be less than ¾-inch standard pipe size.

(4) No specific discharge rate need be applied to such systems.

(d) *Enclosed ventilation systems for rotating electrical propulsion equipment.* (1) The number of pounds of carbon dioxide required for the initial charge shall be equal to the gross volume of the system divided by 10 for systems having a volume of less than 2,000 cubic feet, and divided by 12 for systems having a volume of 2,000 cubic feet or more.

(2) The piping for the initial charge shall be in accordance with Table 95.15–5 (e) (3), and the discharge of the required amount shall be completed within 2 minutes.

(3) In addition to the above there shall be sufficient carbon dioxide available to permit delayed discharges of such quantity as to maintain at least a 25 percent concentration until the equipment can be stopped. If the initial discharge is such as to achieve this concentration until the equipment is stopped, no delayed discharge need be provided.

(4) The piping for the delayed discharge shall not be less than ½-inch standard pipe, and no specific discharge rate need be applied to such systems. On small systems, this pipe may be incorporated with the initial discharge piping.

(e) *Machinery spaces, paint lockers, tanks, and similar spaces.* (1) The number of pounds of carbon dioxide required for each space shall be equal to the gross volume of the space divided by the appropriate factor noted in Table 95.15–5 (e) (1). If fuel can drain from the compartment being protected to an adjacent compartment, or if the compartments are not entirely separate, the requirements for both compartments shall be used to determine the amount of carbon dioxide to be provided. The carbon dioxide shall be arranged to discharge into both such compartments simultaneously.

TABLE 95.15–5 (e) (1)

Gross volume of compartment, cubic feet		Factor
Over	Not over	
----	500	15
500	1,600	16
1,600	4,500	18
4,500	50,000	20
50,000	----	22

(2) For the purpose of the requirements of this paragraph, the volume of the machinery space shall be taken as exclusive of the normal machinery casing unless the boiler, internal combustion machinery, or fuel oil installations extend into such space, in which case the volume shall be taken to the top of the casing or the next material reduction in casing area, whichever is lower.

(3) Branch lines to the various spaces shall be as noted in Table 95.15–5 (e) (3).

TABLE 95.15–5 (e) (3)

Maximum quantity of carbon dioxide required, pounds	Minimum pipe size, inches	Maximum quantity of carbon dioxide required, pounds	Minimum pipe size, inches
100	½	2,500	2½
200	¾	4,450	3
300	1	7,100	3½
600	1¼	10,450	4
1,000	1½	15,000	4½
2,450	2		

(4) Distribution piping within the space shall be proportioned from the supply line to give proper distribution to the outlets without throttling.

(5) The number, type, and location of discharge outlets shall be such as to give a uniform distribution throughout the space.

(6) The total area of all discharge outlets shall not exceed 85 percent nor be less than 40 percent of the sum of the minimum areas of all the cylinder discharges, or the area of the supply pipe, whichever is the smaller.

(7) The discharge of the required amount of carbon dioxide shall be complete within 2 minutes.

§ 95.15–10 *Controls.* (a) The carbon dioxide supply and all controls and valves for the operation of the system shall be outside the spaces protected and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. However, independent systems may be permitted in isolated small spaces such as emergency generator rooms, paint lockers, etc., in which case the cylinders may be inside the space, but the controls shall be outside the space, and a stop valve will not be required.

(b) Distribution piping to the various cargo spaces shall be controlled from not more than two stations. The station controlling the main machinery spaces shall be located as convenient as practicable to one of the main escapes from such spaces.

(c) Each branch line shall be fitted with an approved shut-off valve operable from the station which shall be marked as required by § 97.37–10 of this subchapter. Such shut-off valve shall be kept closed at all times except to operate the particular system.

(d) The arrangements shall be such that the entire charge to any space, other than cargo spaces and delayed discharges to ventilating systems for electrical equipment, can be introduced into the space by the operation of one valve selecting the space, and one control for releasing at least the required amount of carbon dioxide. The controls shall be of an approved type and shall be located adjacent to the shut-off valve controls.

(e) Where provisions are made for the simultaneous release of a given amount of carbon dioxide, provisions shall also be made for manual release in the event of failure of the remote or automatic device.

(f) The distribution controls shall be suitably protected by an enclosing cabinet or casing which shall be marked as required by § 97.37–13 of this subchapter.

(g) Complete but simple instructions for the operation of the system shall be located in a conspicuous place at or near the releasing control device.

(h) If the space or enclosure containing the carbon dioxide supply or controls is to be locked, a key to the space or enclosure shall be in a break-glass-type box conspicuously located adjacent to the opening.

§ 95.15–15 *Piping.* (a) The piping, valves, and fittings shall have a bursting pressure of not less than 6,000 pounds per square inch.

(b) All piping, in nominal sizes not over ¾ inch shall be at least Schedule 40 (standard weight) and in nominal sizes

over ¾ inch, shall be at least Schedule 80 (extra heavy).

(c) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(d) A pressure relief valve or equivalent set to relieve between 2,400 and 2,800 pounds per square inch shall be installed in the distributing manifold or such other location as to protect the piping in the event that all branch line shut-off valves are closed.

(e) All dead-end lines shall extend at least 2 inches beyond the last orifice and shall be closed with cap or plug.

(f) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

(g) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture. Drains and dirt traps shall be located in accessible locations where possible.

(h) Piping shall be used for no other purpose except that it may be incorporated with the fire-detecting system.

(i) Piping passing through living quarters shall not be fitted with drains or other openings within such spaces.

(j) Installation test requirements are:

(1) Upon completion of the piping installation, and before the cylinders are connected, a pressure test shall be applied as set forth in this paragraph. Only carbon dioxide or other inert gas shall be used for this test.

(2) The piping from the cylinders to the stop valves in the manifold shall be subjected to a pressure of 1,000 pounds per square inch. With no additional gas being introduced to the system, it shall be demonstrated that the leakage of the system is such as not to permit a pressure drop of more than 150 pounds per square inch per minute for a 2-minute period.

(3) The individual branch lines to the various spaces protected shall be subjected to a test similar to that described in the preceding subparagraph with the exception that the pressure used shall be 600 pounds per square inch in lieu of 1,000 pounds per square inch. For the purpose of this test, the distribution piping shall be capped within the space protected at the first joint ahead of the nozzles.

(4) In lieu of the tests prescribed in subparagraphs (1) through (3) of this paragraph, small independent systems protecting spaces such as emergency generator rooms, lamp lockers, etc., may be tested by blowing out the piping with air at a pressure of at least 100 pounds per square inch.

§ 95.15–20 *Carbon dioxide storage.* (a) The room for the carbon dioxide storage supply shall be properly ventilated and shall be so located and designed that the anticipated ambient temperature will not exceed 130 degrees F.

(b) Cylinders shall be securely fastened and supported, and where necessary, protected against injury.

(c) Cylinders shall be so mounted as to be readily accessible and capable of easy removal for recharging and inspection. Provisions shall be available for weighing the cylinders.

(d) Where subject to moisture, cylinders shall be so installed as to provide a space of at least 2 inches between the flooring and the bottom of the cylinders.

(e) Cylinders shall be mounted in an upright position or inclined not more than 30 degrees from the vertical. However, cylinders which are fitted with flexible or bent siphon tubes may be inclined not more than 80 degrees from the vertical.

(f) Where check valves are not fitted on each independent cylinder discharge, plugs or caps shall be provided for closing outlets when cylinders are removed for inspection or refilling.

(g) All cylinders used for storing carbon dioxide shall be fabricated, tested, and marked in accordance with the regulations of the I. C. C., except as noted in § 147.04–1 of Subchapter N (Explosives or other Dangerous Articles on Board Vessels) of this chapter.

§ 95.15–25 *Discharge outlets.* (a) Discharge outlets shall be of an approved type.

§ 95.15–30 *Alarms.* (a) Spaces which are protected by a carbon dioxide extinguishing system and are normally accessible to persons on board while the vessel is being navigated, other than paint and lamp lockers and similar small spaces, shall be fitted with an approved audible alarm in such spaces which will be automatically sounded when the carbon dioxide is admitted to the space. The alarm shall be conspicuously and centrally located and shall be marked as required by § 97.37–9 of this subchapter.

§ 95.15–35 *Enclosure openings.* (a) Where mechanical ventilation is provided for spaces other than cargo and similar spaces which are protected by a carbon dioxide extinguishing system, provisions shall be made so that the ventilation system is automatically shut down with the operation of the system to that space.

(b) Where natural ventilation is provided for spaces protected by a carbon dioxide extinguishing system, provisions shall be made for easily and effectively closing off the ventilation.

(c) Means shall be provided for closing all other openings to the space protected from outside such space. In this respect, relatively tight doors, shutters, or dampers shall be provided for openings in the lower portion of the space. The construction shall be such that openings in the upper portion of the space can be closed off either by permanently installed means or by the use of canvas or other material which is normally carried by the vessel.

§ 95.15–40 *Pressure relief.* (a) Where necessary, relatively tight compartments such as refrigeration spaces, paint lockers, etc., shall be provided with suitable means for relieving excessive pressure accumulating within the compartment when the carbon dioxide is injected.

§ 95.15–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangments, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 95.15–5 through 95.15–40 insofar as is reasonable and practicable, with the exception of § 95.15–5 (e) (1) through (3) covering spaces other than cargo spaces, which systems may be installed in accordance with subparagraphs (3) through (6) of this paragraph.

(3) In boiler rooms, the bilges shall be protected by a system discharging principally below the floor plates. Perforated pipe may be used in lieu of discharge nozzles for such systems. The number of pounds of carbon dioxide shall be equal to the gross volume of the boiler room taken to the top of the boilers divided by 36. In the event of an elevated boiler room which drains to the machinery space, the system shall be installed in the engine room bilge and the gross volume shall be taken to the flat on which the boilers are installed.

(4) In machinery spaces where main propulsion internal combustion machinery is installed, the number of pounds of carbon dioxide required shall be equal to the gross volume of the space taken to the under side of the deck forming the hatch opening divided by 22.

(5) In miscellaneous spaces other than cargo or main machinery spaces the number of pounds of carbon dioxide required shall be equal to the gross volume of the space divided by 22.

(6) Branch lines to the various spaces other than cargo and similar spaces shall be as noted in Table 95.15–90 (a) (6). This table is based on cylinders having discharge outlets and siphon tubes of ⅜ inch diameter.

TABLE 95.15–90 (a) (6)

Number of cylinders		Nominal pipe size, inches
Over	Not over	
------	3	1½—standard.
2	4	¾—standard.
3	6	1—extra heavy.
6	12	1¼—extra heavy.
12	16	1½—extra heavy.
16	27	2—extra heavy.
27	39	2½—extra heavy.
39	60	3—extra heavy.
60	80	3½—extra heavy.
80	104	4—extra heavy.
104	165	5—extra heavy.

SUBPART 95.17—FOAM EXTINGUISHING SYSTEMS, DETAILS

§ 95.17–1 *Application.* (a) Where a foam extinguishing system is installed, the provisions of this subpart, with the exception of section 95.17–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 95.17–90.

§ 95.17–5 *Quantity of foam required.* (a) *Area protected.* (1) For machinery and similar spaces, the system shall be so designed and arranged as to spread a blanket of foam over the entire tank top or bilge of the space protected. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(2) Where an installation is made to protect an oil fired boiler installation on a flat which is open to or can drain to the lower engine room or other space, both the flat and the lower space shall be protected simultaneously. The flat shall be fitted with suitable coamings on all openings other than deck drains to properly restrain the oil and foam at that level. Other installations of a similar nature will be considered in a like manner.

(3) Where a system is installed to protect a tank, it shall be so designed and arranged as to spread a blanket of foam over the entire liquid surface of the tank within the range of usual trim. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(b) *Rate of application.* (1) For spaces other than tanks, the rate of discharge to foam outlets protecting the hazard shall be at least as set forth in this subparagraph.

(i) For chemical foam systems with stored "A" and "B" solutions, a total of at least 1.6 gallons per minute of the two solutions shall be discharged for each 10 square feet of area protected.

(ii) For other types of foam systems, the water rate to the dry powder generators or air foam production equipment shall be at least 1.6 gallons per minute for each 10 square feet of area protected.

(2) For tanks, the rate of discharge to foam outlets protecting the hazard shall be as set forth in subparagraph (1) of this paragraph, except that the value of 1 gallon per minute shall be substituted in both cases for the value of 1.6 gallons per minute.

(c) *Supply of foam producing material.* (1) There shall be provided a quantity of foam producing material sufficient to operate the equipment at the discharge rate specified in paragraph (b) of this section for a period of at least 3 minutes for spaces other than tanks, and for at least 5 minutes for tanks.

(d) *Separate supply of foam agent.* A separate supply of foam agent need not be provided for each space protected. The total available supply shall be at least sufficient for the space requiring the greatest amount.

(e) *Water supply for required pumps.* Where pumps are required, the water supply shall be from outside the space protected and shall in no way be dependent upon power from the space protected.

§ 95.17–10 *Controls.* (a) The foam agent, its container, and all controls and valves for the operation of the system shall be of an approved type.

(b) The foam agent container and all controls and valves for the operation of the system shall be outside the space protected and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. The control space shall be as convenient as practicable to one of the main escapes from the spaces protected, and shall be marked as required by § 97.37–13 of this subchapter. Where pumps are required, it shall not be necessary that they be started from the control space.

(c) Complete, but simple instructions for the operation of the system shall be located in a conspicuous place at or near the controls.

(d) The valves to the various spaces served shall be marked as required by § 97.37–10 of this subchapter.

§ 95.17–15 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(c) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

(d) Drains and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

(e) Piping shall be used for no other purpose.

§ 95.17–20 *Discharge outlets.* (a) Discharge outlets shall be of an approved type.

§ 95.17–25 *Additional protection required.* (a) In order that any residual fires above the floor plates may be extinguished when a foam system is installed for the protection of spaces other than tanks, at least 2 fire hydrants, in addition to those required for the machinery space by Subpart 95.10, shall be installed outside of the machinery space entrance. Such hydrants shall be fitted with sufficient hose so that any part of the machinery space may be reached with at least 2 streams of water, and each hose shall be equipped with an approved combination nozzle, applicator, and self-cleaning strainer as described in § 95.10–10 (j) (3).

§ 95.17–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 95.17–5 through 95.17–20, with the exception of § 95.17–5 (a) (2), insofar as is reasonable and practicable. A 6-inch blanket of foam in 5 minutes for tanks and 3 minutes for other spaces will be considered as meeting the requirements of § 95.17–5.

SUBPART 95.20—WATER SPRAY EXTINGUISHING SYSTEM, DETAILS

§ 95.20–1 *Application.* (a) Where a water spray extinguishing system is installed, the provisions of this subpart, with the exception of § 95.20–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 95.20–90.

§ 95.20–5 *Capacity.* (a) The capacity and arrangement shall be such as to effectively blanket the entire area of the tank top. The rate of discharge and the arrangement of piping and nozzles shall be such as to give a uniform distribution over the entire area protected.

(b) Where an installation is made to protect an oil fired boiler installation on a flat which is open to or can drain to the lower engine room or other space, both the flat and the lower space shall be protected simultaneously. The flat shall be fitted with suitable coamings on all openings other than deck drains to properly restrain the oil and water at that level. Other installations of a similar nature will be considered in a like manner.

(c) The water supply shall be from outside the space protected and shall in no way be dependent upon power from the space protected. The pump supplying water for the system shall either be reserved exclusively for the system or it may be one of the fire pumps, provided the capacity of the fire pump as set forth in Table 95.10–5 (a) is increased by the required capacity of the system.

§ 95.20–10 *Controls.* (a) The controls and valves for the operation of the system shall be outside the space protected and shall not be located in such space as might be cut off or made inaccessible in the event of fire in any of the spaces protected. The control space shall be located as convenient as practicable to one of the main escapes from the spaces protected, and shall be marked as required by § 97.37–13 of this subchapter. It shall not be necessary to start the pumps from the control space.

(b) Complete, but simple instructions for the operation of the system shall be located in a conspicous place at or near the controls.

(c) The valves to the various spaces shall be marked as required by § 97.37–10 of this subchapter.

§ 95.20–15 *Piping.* (a) All piping, valves, and fittings shall meet the applicable requirements of Subchapter F (Marine Engineering) of this chapter.

(b) All piping, valves, and fittings of ferrous materials shall be protected inside and outside against corrosion unless specifically approved otherwise by the Commandant.

(c) All piping, valves, and fittings shall be securely supported, and where necessary, protected against injury.

(d) Drains, strainers, and dirt traps shall be fitted where necessary to prevent the accumulation of dirt or moisture.

(e) Piping shall be used for no other purpose.

§ 95.20–20 *Discharge outlets.* (a) Discharge outlets shall be of an approved type.

§ 95.20–25 *Additional protection required.* (a) In order that any residual fires above the floor plates may be extinguished when a water spray system is installed, at least 2 fire hydrants, in addition to those required for the machinery space by Subpart 95.10, shall be installed outside the machinery space entrances. Such hydrants shall be fitted with sufficient hose so that any part of the machinery space may be reached with at least 2 streams of water, and each hose shall be equipped with an approved combination nozzle, applicator, and self-cleaning strainer as described in § 95.10–10 (j) (3).

§ 95.20–90 *Installations contracted for prior to November 19, 1952.* (a) Installations contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Existing arrangements, materials, and facilities previously approved shall be considered satisfactory so long as they meet the minimum requirements of this paragraph and they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and alterations may be made to the same standards as the original installation.

(2) The details of the systems shall be in general agreement with §§ 95.20–5 through 95.20–20, with the exception of § 95.20–5 (b), insofar as is reasonable and practicable.

SUBPART 95.50—HAND PORTABLE FIRE EXTINGUISHERS AND SEMIPORTABLE FIRE EXTINGUISHING SYSTEMS, ARRANGEMENTS AND DETAILS

§ 95.50–1 *Application.* (a) The provisions of this subpart, with the exception of § 95.50–90, shall apply to all vessels, other than fishing vessels, contracted for on or after November 19, 1952. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of § 95.50–90.

§ 95.50–5 *Classification.* (a) Hand portable fire extinguishers and semiportable fire extinguishing systems shall be classified by a combination letter and number symbol. The letter indicating the type of fire which the unit could be expected to extinguish, and the number indicating the relative size of the unit.

(b) The types of fire will be designated as follows:

(1) "A" for fires in ordinary combustible materials where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance.

(2) "B" for fires in flammable liquids, greases, etc., where a blanketing effect is essential.

(3) "C" for fires in electrical equipment where the use of nonconducting extinguishing agent is of first importance.

(c) The number designations for size will start with "I" for the smallest to "V" for the largest. Sizes I and II are considered hand portable fire extinguishers and sizes III, IV, and V are considered semiportable fire extinguishing systems which shall be fitted with suitable hose and nozzle or other practicable means so that all portions of the space concerned may be covered. Examples of size graduations for some of the typical hand portable and semiportable fire extinguishing systems are set forth in Table 95.50–5 (c).

TABLE 95.50–5 (c)

Classification, type, size	Soda-acid and water, gallons	Foam, gallons	Carbon dioxide, pounds	Carbon tetrachloride, quarts	Dry chemical, pounds
A–I	1¼	1¼			
A–II	2½	2½			
B–I		1½	4	1	4
B–II		2½	15		12
B–III		12	35		(1)
B–IV		20	50		(1)
B–V		40	100		(1)
C–I			4	1	4
C–II			15		12

[1] Minimum values not established at this time.

(d) All hand portable fire extinguishers and semiportable fire extinguishing systems shall have permanently attached thereto a metallic name plate giving the name of the item, the rated capacity in gallons, quarts, or pounds, the name and address of the person or firm for whom approved, and the identifying mark of the actual manufacturer.

§ 95.50–10 *Location.* (a) Approved hand portable fire extinguishers and semiportable fire extinguishing systems shall be installed in accordance with Table 95.50–10 (a). The location of the equipment shall be to the satisfaction of the Officer in Charge, Marine Inspection. Nothing in this paragraph shall be construed as limiting the Officer in Charge, Marine Inspection, from requiring such additional equipment as he deems necessary for the proper protection of the vessel.

(b) Semiportable fire extinguishing systems shall be located in the open so as to be readily seen.

(c) If hand portable fire extinguishers are not located in the open or behind glass so that they may be readily seen, they may be placed in enclosures together with the fire hose, provided such enclosures are marked as required by § 97.37–15 of this subchapter.

(d) Hand portable fire extinguishers and their stations shall be numbered in accordance with § 97.37–23 of this subchapter.

(e) Hand portable fire extinguishers in which the medium is stored under pressure shall not be kept in passenger or crew accommodations. However, where specifically required, they may be located in passageways adjacent to entrances of rooms containing hazards.

§ 95.50–15 *Spare charges.* (a) Spare charges shall be carried for at least 50 percent of each type of hand portable fire extinguisher required by § 95.50–10 (a). However, if the unit is of such type

TABLE 95.50–10 (a)—HAND PORTABLE FIRE EXTINGUISHER AND SEMIPORTABLE FIRE-EXTINGUISHING SYSTEMS

Space	Classification (see § 95.50–5)	Quantity and location
Safety areas		
Wheelhouse or fire control room		None required.
Stairway and elevator enclosures		Do.
Communicating corridors	A–II	1 in each main corridor not more than 150 feet apart. (May be located in stairways.)
Lifeboat embarkation and lowering stations		None required.
Radio room	C–I [1]	2 in vicinity of exit.[1]
Accommodations		
Staterooms, toilet spaces, public spaces, offices, lockers, isolated storerooms, and pantries, open decks, etc.		None required.
Service spaces		
Galleys	B–II or C–II	1 for each 2,500 square feet or fraction thereof suitable for hazards involved.
Paint and lamp rooms	B–II	1 outside space in vicinity of exit.
Accessible baggage, mail, and specie rooms, and storerooms.	A–II	1 for each 2,500 square feet or fraction thereof located in vicinity of exits, either inside or outside the spaces.
Carpenter shop and similar spaces	A–II	1 outside the space in vicinity of exit.
Machinery spaces		
Coal-fired boilers: Bunker and boiler space		None required.
Oil-fired boilers: Spaces containing oil-fired boilers, either main or auxiliary, or their fuel-oil units.	B–II B–V	2 required.[2] 1 required.[3]
Internal combustion or gas turbine propelling machinery spaces.	B–II B–III	1 for each 1,000 brake horsepower, but not less than 2 nor more than 6. 1 required.[4] [5]
Electric propulsive motors or generators of open type.	C–II	1 for each propulsion motor or generator unit.
Enclosed ventilating systems for motors and generators of electric propelling machinery.		None required.
Auxiliary spaces:		
Internal combustion or gas turbine	B–II	1 outside the space in vicinity of exit.[3]
Electric emergency motors or generators	C–II	1 outside the space in vicinity of exit.
Steam		None required.
Trunks to machinery spaces		Do.
Fuel tanks		Do.
Cargo spaces		
Inaccessible during voyage, including trunks and cargo tanks.		Do.
Accessible during voyage		Do.

[1] For vessels on an international voyage, substitute 1 C–II in vicinity of exit.
[2] Vessels of less than 1,000 gross tons and not on an international voyage, require 1.
[3] Vessels of 1,000 gross tons and under and not on an international voyage, may substitute 1 B–IV.
[4] If oil burning donkey boiler fitted in space, the B–V previously required for the protection of the boiler room may be substituted.
[5] Not required on vessels under 300 gross tons if fuel has flash point higher than 110° F.

that it cannot be readily recharged by the vessel's personnel, one spare unit of the same classification shall be carried in lieu of spare charges for all such units of the same type.

(b) Spare charges shall be so packaged as to minimize the hazards to personnel while recharging the units. Acid shall be contained in a Crown stopper type of bottle.

(c) Extra safety valve units shall be carried on board for at least 50 percent of all foam type hand portable fire extinguishers and semiportable fire extinguishing systems.

§ 95.50–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) The provisions of §§ 95.50–5 through 95.50–15 shall be met with the exception that existing installations in safety areas and service spaces may be maintained if in the opinion of the Officer in Charge, Marine Inspection, they are in general agreement with the degree of safety prescribed by Table 95.50–10 (a). In such cases, minor modifications may be made to the same standard as the original installation: *Provided*, That in no case will a greater departure from the standards of Table 95.50–10 (a) be permitted than presently exists.

SUBPART 95.60—FIRE AXES

§ 95.60–1 *Application.* (a) The provisions of this subpart shall apply to all vessels.

§ 95.60–5 *Number required.* (a) All vessels except barges shall carry at least the minimum number of fire axes as set forth in Table 95.60–5 (a). Nothing in this paragraph shall be construed as limiting the Officer in Charge, Marine Inspection, from requiring such additional fire axes as he deems necessary for the proper protection of the vessel.

TABLE 95.60–5 (a)

Gross tons		Number of axes
Over	Not over	
------	50	1
50	200	2
200	500	4
500	1,000	6
1,000	------	8

(b) Manned barges shall carry at least two fire axes.

§ 95.60–10 *Location.* (a) Fire axes shall be distributed throughout the spaces available to persons on board so as to be most readily available in the event of emergency.

(b) If fire axes are not located in the open, or behind glass, so that they may be readily seen, they may be placed in enclosures together with the fire hose, provided such enclosures are marked as required by § 97.37–15 of this subchapter.

PART 96—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

Part 96 is amended to read as follows:

SUBPART 96.01—APPLICATION

Sec.
96.01–1 General.

SUBPART 96.03—MARINE ENGINEERING SYSTEMS

96.03–1 Installation and details.

SUBPART 96.05—ELECTRICAL ENGINEERING AND INTERIOR COMMUNICATIONS SYSTEMS

96.05–1 Installation and details.

SUBPART 96.07—ANCHORS, CHAINS, AND HAWSERS

96.07–1 Application.
96.07–5 Ocean, coastwise, or Great Lakes service.
96.07–10 Lakes, bays, and sounds, or river service.
96.07–90 Vessels contracted for prior to November 19, 1952.

SUBPART 96.13—RADIOTELEGRAPH

96.13–1 Required by Federal Communications Commission.

SUBPART 96.15—RADIO DIRECTION FINDER

96.15–1 Application.
96.15–5 Required by Federal Communications Commission.
96.15–90 Vessels contracted for prior to November 19, 1952.

SUBPART 96.17—NAVIGATION LIGHTS AND SHAPES

96.17–1 Vessels other than motorboats.
96.17–5 Motorboats operating on the high seas.
96.17–10 Motorboats operating on the navigable waters of the United States.

SUBPART 96.20—WHISTLES

96.20–1 Vessels other than sailing vessels, barges, and motorboats.
96.20–5 Motorboats operating on the high seas.
96.20–10 Motorboats operating on the navigable waters of the United States.

SUBPART 96.23—FOGHORNS

96.23–1 Vessels other than motorboats.
96.23–5 Motorboats.

SUBPART 96.25—FOG BELLS

96.25–1 Vessels other than motorboats.
96.25–5 Motorboats operating on the high seas.
96.25–10 Motorboats operating on the navigable waters of the United States.

SUBPART 96.27—SOUNDING EQUIPMENT

96.27–1 When required.

SUBPART 96.30—EMERGENCY EQUIPMENT

96.30–1 Application.
96.30–5 General.
96.30–10 Stowage.
96.30–15 Refrigeration masks.
96.30–20 Spare charges.
96.30–90 Vessels contracted for prior to November 19, 1952.

AUTHORITY: §§ 96.01–1 to 96.30–90 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, as amended, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 5, 55 Stat. 244, 245; 46 U. S. C. 391, 392, 404, 367, 526p, 50 U. S. C. App. 1275.

SUBPART 96.01—APPLICATION

§ 96.01–1 *General.* (a) The provisions of this part shall apply to all vessels except as specifically noted in this part.

SUBPART 96.03—MARINE ENGINEERING SYSTEMS

§ 96.03–1 *Installation and details.* (a) The installation of all systems of a marine engineering nature, together with the details of design, construction, and installation, shall be in accordance with the requirements of Subchapter F (Marine Engineering) of this chapter. Systems of this type include the following:

Steering Systems.
Bilge and Ballast Systems.
Tank Vent and Sounding Systems.
Overboard Discharges and Shell Connections.
Pipe and Pressure Systems.
Liquefied Petroleum Gas For Cooking and Heating.

SUBPART 96.05—ELECTRICAL ENGINEERING AND INTERIOR COMMUNICATIONS SYSTEMS

§ 96.05–1 *Installation and details.* (a) The installation of all systems of an electrical engineering or interior communication nature, together with the details of design, construction, and installation, shall be in accordance with the requirements of Subchapter J (Electrical Engineering) of this chapter. Systems of this type include the following:

Ship's Service Lighting and Power Systems.
Emergency Lighting and Power Systems.
General Alarm Systems.
Sound Powered Telephone and Voice Tube Communication Systems.
Engine Order Telegraph Systems.
Rudder Angle Indicator Systems.
Refrigerated Spaces Alarm Systems.
Miscellaneous Machinery Alarms and Controls.
Daylight Signaling Lamps.

SUBPART 96.07—ANCHORS, CHAINS, AND HAWSERS

§ 96.07–1 *Application.* (a) The provisions of this subpart, with the exception of § 96.07–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 96.07–90.

§ 96.07–5 *Ocean, coastwise, or Great Lakes service.* (a) Vessels in ocean, coastwise, or Great Lakes service shall be fitted with anchors, chains, and hawsers in general agreement with the standards established by the American Bureau of Shipping, see Subpart 90.35 of this subchapter.

§ 96.07–10 *Lakes, bays, and sounds, or river service.* (a) Vessels in lakes, bays and sounds, or river service shall be fitted with such ground tackle and hawsers as deemed necessary by the Officer in Charge, Marine Inspection, depending upon the size of the vessel and the waters on which it operates.

§ 96.07–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Installations previously accepted or approved shall be considered satisfactory for the same service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. If the service of the

vessel is changed, the suitability of the equipment will be established by the Officer in Charge, Marine Inspection.

SUBPART 96.13—RADIOTELEGRAPH

§ 96.13–1 *Required by Federal Communications Commission.* (a) Radiotelegraph installations are required on certain vessels. Details of the application of this requirement as well as details of the installation shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission.

SUBPART 96.15—RADIO DIRECTION FINDER

§ 96.15–1 *Application.* (a) The provisions of this subpart, with the exception of § 96.15–90, shall apply to all mechanically propelled vessels of 1,600 gross tons and over in ocean service or on an international voyage contracted for on or after November 19, 1952. Such vessels contracted for prior to November 19, 1952, shall meet the requirements of § 96.15–90.

§ 96.15–5 *Required by Federal Communications Commission.* (a) All vessels shall be fitted with a radio direction finder. Details of the installation shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission.

§ 96.15–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) Vessels of over 5,000 gross tons shall meet the requirements of § 96.15–5.

(2) Vessels of from 1,600 gross tons through 5,000 gross tons shall meet the requirements of § 96.15–5 on or before November 19, 1954.

SUBPART 96.17—NAVIGATION LIGHTS AND SHAPES

§ 96.17–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be equipped with navigation lights and shapes as prescribed by the Pilot Rules applicable to the waters on which the vessel is navigated.

§ 96.17–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for navigation lights and shapes prescribed by § 96.17–1 for vessels other than motorboats.

§ 96.17–10 *Motorboats operating on the navigable waters of the United States.* (a) Every motorboat operating on the navigable waters of the United States shall, in all weathers from sunset to sunrise, carry and exhibit lights when under way as prescribed by this section, and during such time no other lights which may be mistaken for those prescribed shall be exhibited. No penalty is incurred by motorboats for a failure to carry lights between the hours of sunrise and sunset.

(b) Every motorboat of Classes A and 1 shall carry the following lights:

(1) A bright light aft to show all around the horizon.

(2) A combined lantern in the fore part of the vessel and lower than the white light aft, showing green to starboard and red to port, so fixed as to throw the light from right ahead to 2 points abaft the beam on their respective sides.

(c) Every motorboat of Classes 2 and 3 shall carry the following lights:

(1) A bright white light in the fore part of the vessel as near the stem as practicable so constructed as to show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light 10 points on each side of the vessel; namely, from right ahead to 2 points abaft the beam on either side.

(2) A bright white light aft to show all around the horizon and higher than the white light forward.

(3) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side. The said lights shall be fitted with inboard screens of sufficient length and height or shall be mounted on cabin sides and so set as to prevent these lights from being seen across the bow.

(d) All motorboats propelled by sail and machinery or by sail alone shall carry and exhibit the following lights.

(1) Motorboats of Classes A and 1 when propelled by sail and machinery or by sail alone shall carry the white light prescribed by paragraph (b) (1) of this section, but not the lantern prescribed by paragraph (b) (2) of this section.

(2) Motorboats of Classes 2 and 3 when propelled by sail and machinery or by sail alone shall carry the colored lights prescribed by paragraph (c) (3) of this section, but not the white lights prescribed by paragraphs (c) (1) and (2) of this section.

(3) In addition, motorboats of all classes when so propelled shall carry ready at hand a lantern or flashlight showing a white light which shall be exhibited in sufficient time to avert collision.

(e) Every white light prescribed by this section shall be of a character as to be visible at a distance of at least 2 miles. Every colored light prescribed by this section shall be of such character as to be visible at a distance of at least 1 mile. The word "visible" when applied to lights shall mean visible on a dark night with clear atmosphere.

(f) The lights described in § 96.17–10 (b) through (e) are required by the Motorboat Act, as amended (sec. 3, 54 Stat. 164, 46 U. S. C. 526b). Other navigation lights and shapes required by the Pilot Rules applicable to the waters on which the motorboat is operated, such as anchor lights, amber whistle light, etc., which are not in conflict with the lights required by the Motorboat Act, shall also be carried.[1]

[1] Running lights. The lights provided for in sec. 3 of the act of April 25, 1940 (54 Stat. 164, U. S. C. 526b), are running lights for motorboats subject to the provisions of that act in lieu of the lights prescribed, respectively, by art. 2 of the act approved June 7, 1897 (30 Stat. 96, 33 U. S. C. 172) (covering certain harbors, rivers, and inland waters of the United States); rule 3 of the act approved February 8, 1895, as amended (28 Stat. 645, as amended, 33 U. S. C. 252) (covering the Great Lakes and their connecting and tributary waters); and rules 3, 5, 6, and 7 of R. S. 4233, as amended (28 Stat. 672, 33 U. S. C. 312, 314–316) (covering western rivers and the Red River of the North). These running lights are required to be carried on all motorboats when under way on navigable waters of the United States, in all weathers, from sunset to sunrise, but not on the high seas. Motorboats, when on the high seas, shall exhibit the lights prescribed by the international rules of 1890, as amended (26 Stat. 321–325, as amended, 33 U. S. C. 71–82). The provisions of sec. 3 or the act of April 25, 1940 (54 Stat. 164, 46 U. S. C. 526b), requiring running lights on motorboats are not in conflict with the provisions of the acts previously cited requiring anchor lights and other lights in addition to the running lights on pilot, towing, and fishing vessels. It will be observed that the penalties for violations of existing laws not in conflict with the act of April 25, 1940 (54 Stat. 163–167, 46 U. S. C. 526–526t), remain unchanged.

SUBPART 96.20—WHISTLES

§ 96.20–1 *Vessels other than sailing vessels, barges, and motorboats.* (a) All vessels other than sailing vessels, barges, and motorboats, shall be equipped with an efficient whistle or similar appliance to give the necessary whistle signals required by the Pilot Rules applicable to the waters on which the vessel is navigated. The location of the whistle and operating devices shall be as follows:

(1) Means shall be provided to operate the whistle or other appliance by mechanical means from a position adjacent to the main steering station and from the steering station on top of the wheelhouse where such steering station is fitted. Details of the whistle operating device shall be as described in Subchapter J (Electrical Engineering) of this chapter.

(2) In general, the whistle shall be located on the forward side of or above the structure of the vessel so as to be as free of obstructions as possible. Where practicable, it shall be installed at least 6 feet above the wheelhouse, except that on vessels navigating the Western Rivers, and any vessel of less than 100 gross tons, it shall be at least 2 feet above the wheelhouse.

(3) On double ended ferry vessels and similar vessels, where steam whistles are employed, they shall be installed both forward and aft of the stacks or one such whistle on either the port or starboard side of the stack.

§ 96.20–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for whistles or similar appliances prescribed by § 96.20–1 for vessels other than motorboats.

§ 96.20–10 *Motorboats operating on the navigable waters of the United States.* (a) Motorboats operating on the navigable waters of the United States shall be provided with an efficient whistle

or other sound-producing mechanical device as set forth in Table 96.20–10 (a).

TABLE 96.20-10 (a)

Class of motorboat	Type of device
A	None.
1	Mouth, hand or power operated, capable of producing a blast of 2 seconds or more duration and audible for at least ½ mile.
2	Hand or power operated, capable of producing a blast of 2 seconds or more duration, and audible for a distance of at least 1 mile.
3	Power operated, capable of producing a blast of 2 seconds or more duration, and audible for a distance of at least 1 mile.

SUBPART 96.23—FOG HORNS

§ 96.23–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be equipped with an efficient fog horn as prescribed by the Pilot Rules applicable to the waters on which the vessel is navigated. On vessels in ocean or coastwise service, the foghorn shall be sounded by mechanical means.

§ 96.23–5 *Motorboats.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for foghorns prescribed by § 96.23–1 for vessels other than motorboats.

SUBPART 96.25—FOG BELLS

§ 96.25–1 *Vessels other than motorboats.* (a) All vessels other than motorboats shall be provided with an efficient fog bell at least 8 inches in diameter. The fog bell shall be located where the sound will be least obstructed.

§ 96.25–5 *Motorboats operating on the high seas.* (a) All motorboats operating on the high seas outside the navigable waters of the United States shall meet the requirements for fog bells prescribed by § 96.25–1 for vessels other than motorboats.

§ 96.25–10 *Motorboats operating on the navigable waters of the United States.* (a) When operating on the navigable waters of the United States, motorboats of Classes A and 1 are not required to carry fog bells. However, motorboats of Classes 2 and 3 operating on the navigable waters of the United States shall be provided with an efficient fog bell.

SUBPART 96.27—SOUNDING EQUIPMENT

§ 96.27–1 *When required.* (a) All mechanically propelled vessels in ocean or coastwise service of 500 gross tons and over, and all mechanically propelled vessels in Great Lakes service of 1,500 gross tons and over, except paddle wheel vessels, shall be fitted with an efficient mechanical deep-sea sounding apparatus in addition to the deep-sea hand leads. On Great Lakes vessels, a shallow water alarm may be substituted.

SUBPART 96.30—EMERGENCY EQUIPMENT

§ 96.30–1 *Application.* (a) The provisions of this subpart, with the exception of § 96.30–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 96.30–90.

§ 96.30–5 *General.* (a) All self-contained breathing apparatus and gas masks shall be of an approved type, constructed in accordance with Subpart 160.011 of Subchapter Q (Specifications) of this chapter.

(b) All flame safety lamps shall be of an approved type, constructed in accordance with Subpart 160.016 of Subchapter Q (Specifications) of this chapter.

(c) All emergency equipment shall be maintained in an operative condition, and it shall be the responsibility of the master and chief engineer to ascertain that a sufficient number of the crew are familiar with the operation of the equipment.

§ 96.30–10 *Stowage.* (a) On all vessels of 1,000 gross tons and over on an international voyage, emergency equipment consisting of one self-contained breathing apparatus, one flame safety lamp, one axe, and one portable electric drill, together with such other items as the master may deem necessary, shall be stowed in convenient, accessible locations for use in case of emergency.

§ 96.30–15 *Refrigeration masks.* (a) On all vessels equipped with refrigeration, other than small unit type refrigerations of not more than 20 cubic feet capacity, a gas mask suitable for protection against each refrigerant used shall be provided. The refrigeration gas masks shall be stowed convenient to, but outside of, the spaces containing the refrigeration equipment.

§ 96.30–20 *Spare charges.* (a) A complete recharge shall be carried for each gas mask and self-contained breathing apparatus. The spare charge shall be stowed in the same location as the equipment it is to reactivate.

§ 96.30–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the following requirements:

(1) The requirements of §§ 96.30–5 through 96.30–20 shall be complied with insofar as the number of items of equipment and the method of stowage of the equipment is concerned. Existing items of equipment previously approved, but not meeting the applicable specifications set forth in § 96.30–5, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection, but all new installations or replacements shall meet the applicable specifications or requirements in this subpart.

PART 97—OPERATIONS

Part 97 is amended to read as follows:

SUBPART 97.01—APPLICATION

Sec.
97.01–1 General.

SUBPART 97.03—STATUTORY PENALTIES

97.03–1 General.

SUBPART 97.05—NOTICE TO MARINERS AND AIDS TO NAVIGATION

97.05–1 Duty officers.
97.05–5 Charts.

SUBPART 97.07—NOTICE OF CASUALTY AND VOYAGE RECORDS

Sec.
97.07–1 Notice of casualty.
97.07–5 Information required.
97.07–10 Written report.
97.07–15 Retention of records.
97.07–20 Aids to navigation.
97.07–25 Reports when state of war exists.

SUBPART 97.10—PERSONS ALLOWED IN PILOT-HOUSE AND ON NAVIGATION BRIDGE

97.10–1 Application.
97.10–5 Persons excluded.
97.10–10 Posting.

SUBPART 97.13—STATION BILLS

97.13–1 Application.
97.13–5 Master's responsibility.
97.13–10 Duties of crew.
97.13–15 Emergency signals.
97.13–25 Manning of lifeboats and life rafts.
97.13–30 Master to instruct crew.

SUBPART 97.15—TESTS, DRILLS, AND INSPECTIONS

97.15–1 Steering gear, whistle, and means of communication.
97.15–5 Drafts and load line markings.
97.15–10 Sanitation.
97.15–15 Examination of boilers and machinery.
97.15–20 Hatches and other openings.
97.15–25 Line-throwing appliances.
97.15–30 Emergency lighting and power systems.
97.15–35 Fire and boat drills.
97.15–40 Electric power operated lifeboat winches.
97.15–45 Lifeboats and life rafts.

SUBPART 97.17—STEERING ORDERS

97.17–1 Method of communicating.

SUBPART 97.20—WHISTLING

97.20–1 Unnecessary whistling prohibited.

SUBPART 97.23—UNAUTHORIZED LIGHTS

97.23–1 Unauthorized lights prohibited.

SUBPART 97.25—SEARCHLIGHTS

97.25–1 Improper use prohibited.

SUBPART 97.27—LOOKOUTS

97.27–1 Lookouts required.
97.27–5 Master's and officer's responsibility.

SUBPART 97.30—REPORTS OF ACCIDENTS, REPAIRS, AND UNSAFE EQUIPMENT

97.30–1 Repairs to boilers and pressure vessels.
97.30–5 Accidents to machinery.
97.30–10 Notice required before repair.
97.30–15 Fusible plugs.

SUBPART 97.33—CABLE TRAVELER

97.33–1 When required.

SUBPART 97.35—LOG BOOK ENTRIES

97.35–1 Log books and records.
97.35–5 Actions required to be logged.
97.35–10 Official log entries.

SUBPART 97.37—MARKING FOR FIRE AND EMERGENCY EQUIPMENT, ETC.

97.37–1 Application.
97.37–3 General.
97.37–5 General alarm bell switch.
97.37–7 General alarm bells.
97.37–10 Fire extinguishing system branch lines.
97.37–13 Fire extinguishing system controls.
97.37–15 Fire hose stations.
97.37–20 Self-contained breathing apparatus and gas masks.
97.37–23 Hand portable fire extinguishers.
97.37–25 Emergency lights.
97.37–33 Instructions for changing steering gear.
97.37–35 Rudder orders.
97.37–37 Lifeboats.

Sec.
97.37-40 Life rafts.
97.37-43 Life preservers and ring life buoys.
97.37-45 Fire hose and axes.
97.37-47 Portable magazine chests.
97.37-90 Vessels contracted for prior to November 19, 1952.

SUBPART 97.40—MARKINGS ON VESSELS

97.40-1 Application.
97.40-5 Markings required by Customs Regulations.
97.40-10 Draft marks.
97.40-15 Load line marks.

SUBPART 97.43—PLACARD OF BREECHES BUOY INSTRUCTIONS

97.43-1 Application.
97.43-5 Where posted.

SUBPART 97.45—CARRYING OF EXCESS STEAM

97.45-1 Master and chief engineer responsible.

SUBPART 97.47—ROUTING INSTRUCTIONS

97.47-1 All persons must comply.

SUBPART 97.50—COMPLIANCE WITH PROVISIONS OF CERTIFICATE OF INSPECTION

97.50-1 Master or person in charge responsible.

SUBPART 97.53—EXHIBITION OF LICENSE

97.53-1 Licensed officers.

AUTHORITY: §§ 97.01-1 to 97.53-1 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, 4418, 4426, 4453, as amended, secs. 1, 2, 49 Stat. 1544, sec. 17, 54 Stat. 166, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391, 392, 404, 435, 367, 526p, 50 U. S. C. App. 1275.

SUBPART 97.01—APPLICATION

§ 97.01-1 *General.* (a) The provisions of this part shall apply to all vessels except as specifically noted in this part.

SUBPART 97.03—STATUTORY PENALTIES

§ 97.03-1 *General.* (a) The marine safety and criminal statutes provide penalties for the violation of the applicable provisions of this subchapter, which penalties, depending upon the gravity of the violation, are as follows:

(1) Assessment and collection of civil monetary penalty.

(2) Criminal prosecution where no loss of life results.

(3) Criminal prosecution for manslaughter where loss of life results from violation of statute or regulation or from misconduct, negligence, or inattention to duty.

(4) Libel against vessel.

(b) In addition to the foregoing, any licensed or certificated personnel committing an act of misbehavior, negligence, unskillfulness, endangering life, violation of marine safety statutes or regulations or requirements thereunder, and incompetency shall be subject to proceedings under the provisions of 46 U. S. C. 239 and regulations thereunder (Part 137) with respect to suspension or revocation of license or certificate.

SUBPART 97.05—NOTICE TO MARINERS AND AIDS TO NAVIGATION

§ 97.05-1 *Duty of officers.* (a) Licensed deck officers are required to acquaint themselves with the latest information published by the Coast Guard and the United States Navy regarding aids to navigation. Neglect to do so is evidence of neglect of duty. It is desirable that vessels shall have available in the pilothouse for convenient reference at all times a file of the applicable Notice to Mariners.

(1) Notice to Mariners, published weekly by the Coast Guard, contains announcements and information regarding aids to navigation and charts of waters of the United States and is available for free distribution at field offices of the Coast Guard, United States Coast and Geodetic Survey field stations, and the Marine Division, Customhouse.

(2) Notice to Mariners, published weekly by the United States Navy for the correction of charts, sailing directions, light lists, and other publications, and which includes foreign waters and certain waters of the United States, is available for free distribution at the Hydrographic Office, Branch Hydrographic Offices, or any of the agencies of seaboard ports, and is also on file in the United States consulates where they may be inspected.

§ 97.05-5 *Charts.* (a) All vessels shall have charts of the waters on which they operate available for convenient reference at all times.

SUBPART 97.07—NOTICE OF CASUALTY AND VOYAGE RECORDS

§ 97.07-1 *Notice of casualty.* (a) The owner, agent, master, or person in charge of a vessel involved in a marine casualty shall give notice as soon as possible to the nearest marine inspection office of the U. S. Coast Guard whenever the casualty results in any of the following:

(1) Damage to property in excess of $1,500.

(2) Material damage affecting the seaworthiness or efficiency of a vessel.

(3) Stranding or grounding.

(4) Loss of life.

(5) Injury causing any persons to remain incapacitated for a period in excess of 72 hours; except injuries to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

§ 97.07-5 *Information required.* (a) The notice required by § 97.07-1 shall show the name and official number of the vessel involved, the owner or agent thereof, the nature and probable cause of the casualty, the locality in which it occurred, the nature and extent of injury to persons and the damage to property.

§ 97.07-10 *Written report.* (a) In addition to the notice required above, the person in charge of the vessel shall, as soon as possible, report in writing and in person to the Officer in Charge, Marine Inspection, at the port in which the casualty occurred or nearest the port of first arrival. However, if from a distance it may be inconvenient to report in person, it may be done in writing only. The written report required herein for personal accident not involving death shall be made on Form CG-924E and for all other marine casualties or accidents the written report shall be made on Form CG-2692. If filed without delay these forms may also provide the notice required by § 97.07-1.

§ 97.07-15 *Retention of records.* (a) The owner, agent, master, or other person in charge of any vessel involved in a marine casualty shall retain such voyage records of the vessel as are maintained by the vessel, such as both rough and smooth deck and engine room logs, bell books, navigation charts, navigation work books, compass deviation cards, gyrocompass records, storage plans, record of draft, aids to mariners, radiograms sent and received, the radio log and crew and passenger lists. The owner, agent, master, or other officer in charge, shall make these records available to a duly authorized Coast Guard officer or employee for examination upon request.

§ 97.07-20 *Aids to navigation.* (a) Whenever a vessel collides with a lightship, buoy, or other aid to navigation under the jurisdiction of the Coast Guard, or is connected with any such collision, it shall be the duty of the person in charge of such vessel to report the accident to the nearest Officer in Charge, Marine Inspection. No report on Form CG-2692 is required unless any of the results listed in § 97.07-1 (a) occur.

§ 97.07-25 *Reports when state of war exists.* (a) During the period when a state of war exists between the United States and any foreign nation, communications in regard to casualties or accidents shall be handled with caution and the reports shall not be made by radio or by telegram.

SUBPART 97.10—PERSONS ALLOWED IN PILOTHOUSE AND ON NAVIGATION BRIDGE

§ 97.10-1 *Application.* (a) The provisions of this subpart shall apply to all vessels carrying passengers.

§ 97.10-5 *Persons excluded.* (a) Masters and pilots shall exclude from the pilothouse and navigator's bridge while under way, all persons not connected with the navigation of the vessel. However, inspectors of the Coast Guard, licensed officers of vessels, persons regularly engaged in learning the profession of pilot, officers of the Coast Guard, United States Navy, United States Coast and Geodetic Survey, and the Engineer Department of the United States Army, or Maritime Administration personnel, may be allowed in the pilothouse or upon the navigator's bridge upon the responsibility of the officer in charge.

§ 97.10-10 *Posting.* (a) The master of every vessel shall keep three printed copies of § 97.10-5, Form CG-802, posted in conspicuous places on such vessel, one of which shall be kept posted in the pilothouse.

(b) Such printed copies may be obtained from the Officer in Charge, Marine Inspection.

SUBPART 97.13—STATION BILLS

§ 97.13-1 *Application.* (a) The provisions of this subpart shall apply to all vessels of over 500 gross tons.

§ 97.13-5 *Master's responsibility.* A station bill (muster list) shall be prepared by the master of the vessel who shall be responsible to sign such station

bill and to ascertain that it is duly posted in conspicuous locations in the vessel, particularly in the crew quarters, before the vessel sails.

§ 97.13–10 *Duties of crew.* (a) The station bill shall set forth the special duties and duty station of each member of the crew for the various emergencies. The duties shall, as far as possible, be comparable with the regular work of the individual. The duties shall in general include the following and in addition, such other duties shall be assigned as are necessary in the case of the particular vessel for the proper handling of the particular emergency:

(1) The closing of airports, watertight doors, scuppers, sanitary and other discharges which lead through the vessel's hull below the margin line, etc., the stopping of fans and ventilating systems, and the operation of all safety equipment.

(2) The preparation and launching of lifeboats and life rafts.

(3) The extinction of fire.

(4) The muster of passengers, if carried, which shall in general be assigned to the stewards department, and shall include the following:

(i) Warning the passengers.

(ii) Seeing that they are dressed and have put on their life preservers in a proper manner.

(iii) Assembling the passengers and directing them to the appointed stations.

(iv) Keeping order in the passageways and stairways and generally controlling the movement of the passengers.

(v) Seeing that a supply of blankets is taken to the lifeboats.

(5) The custody of the portable radio apparatus required by Subpart 94.55 of this subchapter.

§ 97.13–15 *Emergency signals.* (a) The station bill shall set forth the various signals to be used for the calling of the crew to their stations and for giving instructions while at their stations. These signals shall be as set forth in this section.

(b) (1) The fire alarm signal shall be a continuous rapid ringing of the ship's bell for a period not less than ten seconds supplemented by the continuous ringing of the general alarm bells for not less than ten seconds.

(2) For dismissal from fire alarm stations, the general alarm shall be sounded three times supplemented by three short blasts of the whistle.

(c) (1) The signal for boat stations or boat drill shall be a succession of more than six short blasts followed by one long blast of the whistle supplemented by a comparable signal on the general alarm bells.

(2) Where whistle signals are used for handling the lifeboats, they shall be as follows:

(i) To lower lifeboats, one short blast.

(ii) To stop lowering the lifeboats, two short blasts.

(3) For dismissal from boat stations, there shall be three short blasts of the whistle.

(d) In the case of river vessels, the ship's bell may be used in lieu of the whistle signals stipulated in the section.

(e) The master of any vessel may establish such other emergency signals, in addition to the above, as will provide that all officers, crew, and passengers will have positive and certain notice of the existing emergency.

§ 97.13–25 *Manning of lifeboats and life rafts.* (a) There shall be for each lifeboat a number of certificated lifeboatmen equal to that specified in Table 97.13–25 (a).

TABLE 97.13–25 (a)

Prescribed complement of lifeboat		Minimum number of lifeboatmen	
Over	Not over	Ocean service	All services other than ocean [1]
----------	25	2	1
25	40	2	2
40	60	3	3
60	85	4	4
85	110	5	5
110	----------	6	6

[1] Certificated lifeboatmen not required in river service

(b) The allocation of the certificated lifeboatmen to each lifeboat shall be at the discretion of the master according to the circumstances.

(c) The master shall appoint a first and second in command for each lifeboat and life raft. On all services other than rivers, these persons shall be either licensed deck officers or certificated lifeboatmen, except for life rafts approved for 15 persons or less on vessels in Great Lakes or lakes, bays, and sounds service. The person in charge of the lifeboat or life raft shall have a list of its crew, and shall see that the persons under his orders are acquainted with their several duties.

(d) The master shall assign to each motor-propelled lifeboat a man capable of working the motor.

(e) The master shall assign to each lifeboat carrying a wireless and searchlight a man capable of operating such equipment.

§ 97.13–30 *Master to instruct crew.* (a) The master shall conduct such drills and give such instructions as are necessary to insure that all hands are familiar with their duties as specified in the station bill.

SUBPART 97.15—TESTS, DRILLS, AND INSPECTIONS

§ 97.15–1 *Steering gear, whistle, and means of communication.* (a) On all vessels making a voyage of more than 48 hours' duration, the entire steering gear, the whistle, and the means of communication between the bridge or pilothouse and the engine room shall be examined and tested by an officer of the vessel within a period of not more than 12 hours prior to departure. On all other vessels similar examinations and tests shall be made at least once in every week.

(b) The date of the test and the condition of the equipment shall be noted in the official log book.

§ 97.15–5 *Drafts and load line markings.* (a) The master of every vessel on an ocean, coastwise, or Great Lakes voyage shall enter the drafts of the vessel, forward and aft, in the official log book when leaving port.

(b) On vessels subject to the requirements of Subchapter E (Load Lines) of this chapter at the time of departure from port on an ocean, coastwise, or Great Lakes voyage, the master shall insert in the official log book a statement of the position of the load line mark, port and starboard, in relation to the surface of the water in which the vessel is then floating.

(1) When an allowance for draft is made for density of the water in which the vessel is floating, this density is to be noted in the official log book.

§ 97.15–10 *Sanitation.* (a) It shall be the duty of the master and chief engineer to see that the vessel, and, in particular, the quarters are in a clean and sanitary condition. The chief engineer shall be responsible only for the sanitary condition of the engineering department.

§ 97.15–15 *Examination of boilers and machinery.* (a) It shall be the duty of the chief engineer when he assumes charge of the boilers and machinery of a vessel to examine them thoroughly. If any parts thereof are in bad condition, or if the safety-valve seals are broken, the fact shall immediately be reported to the master, owner or agent, and the Officer in Charge, Marine Inspection.

§ 97.15–20 *Hatches and other openings.* (a) It shall be the responsibility of the master to assure himself before leaving protected waters that all exposed cargo hatches of his vessel are closed and made properly tight. However, vessels in Great Lakes service engaged in the sand, gravel, stone, coal, or similar trade, need not be provided with hatch covers or closing devices if the capacity of the hoppers or boxes does not exceed the safe carrying capacity of the vessel.

(b) The following doors, ports, and other openings shall be kept closed while the vessel is being navigated, and shall be closed before the vessel commences a voyage:

(1) Gangway, cargo, and coaling ports fitted below the freeboard deck.

(2) Port lights that are not accessible during navigation. Dead covers on such port lights shall also be secured.

(c) The time of opening and closing of hatches and other openings noted in this section shall be entered in the official log book. In the event that the master at his discretion does not secure the hatches, a notation of this fact shall be made in the official log book. If it becomes essential for the safety of the vessel to open any of the fittings noted in this section while at sea, the circumstances and the time of opening and closing shall be entered in the official log book.

§ 97.15–25 *Line-throwing appliances.* (a) On vessels fitted with a line-throwing appliance, it shall be the duty of the master to drill his crew in the use of such appliance, and require it to be fired at least once in every 3 months. Each drill shall be recorded in the vessel's official log book. The service line shall not be used for drill purpose. The drill shall be conducted as follows:

(1) For impulse-projected rocket type, by actually firing the rocket with any flexible line of proper size and length, suitably faked or laid out.

(2) For shoulder gun type, by actually firing, using the regular cartridge and projectile with any flexible line of proper size and length, suitably faked or laid out.

(3) For Lyle gun type, by actually firing, using 2½ ounces of powder, the regular service projectile with any flexible line of proper size and length suitably faked or laid out.

§ 97.15–30 *Emergency lighting and power systems.* (a) Where fitted, it shall be the duty of the master to see that the emergency lighting and power systems are operated and inspected at least once in each week that the vessel is navigated to be assured that the system is in proper operating condition.

(b) Internal combustion engine driven emergency generators shall be operated under load for at least 2 hours, at least once in each month that the vessel is navigated.

(c) Storage batteries for emergency lighting and power systems shall be tested at least once in each 6-month period that the vessel is navigated to demonstrate the ability of the storage battery to supply the emergency loads for the specified period of time.

(d) The date of the tests and the condition and performance of the apparatus shall be noted in the official log book.

§ 97.15–35 *Fire and boat drills.* (a) The master shall be responsible for conducting a fire and boat drill at least once in every week.

(b) The fire and boat drill shall be conducted as if an actual emergency existed. All hands should report to their respective stations and be prepared to perform the duties specified in the station bill.

(1) Fire pumps shall be started and a sufficient number of outlets used to ascertain that the system is in proper working order.

(2) All rescue and safety equipment shall be brought from the emergency equipment lockers and the persons designated shall demonstrate their ability to use the equipment.

(3) All watertight doors which are in use while the vessel is under way shall be operated.

(4) Weather permitting, lifeboat covers and strongbacks shall be removed, plugs or caps put in place, boat ladders secured in position, painters led forward and tended, and other lifesaving equipment prepared for use. The motor and hand-propelling gear of each lifeboat, where fitted, shall be operated for at least 5 minutes.

(5) The passengers, if carried, shall be encouraged to fully participate in these drills and shall be instructed in the use of the life preservers.

(6) In port, the unobstructed lifeboats shall be lowered to the water and the crew exercised in the use of the oars and other means of propulsion if provided for the lifeboat. Although all lifeboats may not be used in a particular drill, care shall be taken that all lifeboats are given occasional use to ascertain that all lowering equipment is in proper order and the crew properly trained. The master shall be responsible that each lifeboat is lowered to the water at least once in each 3 months.

(7) When the vessel is under way, and weather permitting, all lifeboats shall be swung out to ascertain that the gear is in proper order.

(8) The person in charge of each lifeboat shall have a list of its crew and shall see that the men under his command are acquainted with their duties.

(c) An entry shall be made in the vessel's official log book relative to each fire and boat drill setting forth the date and hour, length of time of the drill, numbers on the lifeboats swung out, the length of time that motor- and hand-propelled lifeboats are operated, the number of lengths of hose used, together with a statement as to the condition of all fire and lifesaving equipment, watertight door mechanisms, valves, etc.

(d) A copy of these requirements, Form CG 809B, shall be framed under glass and posted in a conspicuous place about the vessel. This form may be obtained from the Officer in Charge, Marine Inspection.

§ 97.15–40 *Electric power operated lifeboat winches.* (a) It shall be the duty of the master to see that all lifeboat winch control apparatus, including motor controllers, emergency switches, master switches, and limit switches, are examined at least once in each 3 months. The examination shall include the removal of drain plugs and/or the opening of drain valves in such appliances to assure that the enclosures are free of water.

(b) The date of the examination required by this section and the condition of the equipment shall be noted in the official log book.

§ 97.15–45 *Lifeboats and life rafts.* (a) The master shall assign to one or more officers the duty of seeing that the lifeboats and life rafts are at all times ready for immediate use. The decks on which such equipment are stowed shall be kept clear of cargo or any other obstructions which would interfere with the immediate launching of such equipment.

(b) Where motor-propelled lifeboats are carried, the motor of each lifeboat shall be operated in the ahead and astern position for a period of not less than 5 minutes at least once in each week.

(c) All lifeboats and life rafts shall be stripped, cleaned, and thoroughly overhauled at least once in every year. When lifeboats are removed from a vessel for this purpose on a rotational basis, the installation test prescribed by Subpart 94.35 of this subchapter need not be made.

(d) The fuel tanks of all motor-propelled lifeboats shall be emptied and the fuel changed at least once in every year.

(e) Vessels in ocean or coastwise service having a sufficient number of lifeboats on each side to accommodate all persons on board may care for their lifeboats at sea: *Provided,* That a number of lifeboats sufficient to accommodate all persons on board are fully equipped and ready for use at all times.

SUBPART 97.17—STEERING ORDERS

§ 97.17–1 *Method of communicating.* (a) All steering orders shall be given and communicated in terms of "right rudder" where it is intended that the top of the wheel, the rudder blade, and the head of the ship should go to the right, and "left rudder" where it is intended that the top of the wheel, the rudder blade, and the head of the ship should go to the left.

SUBPART 97.20—WHISTLING

§ 97.20–1 *Unnecessary whistling prohibited.* (a) The unnecessary sounding of the vessel's whistle is prohibited within any harbor limits of the United States.

SUBPART 97.23—UNAUTHORIZED LIGHTS

§ 97.23–1 *Unauthorized lights prohibited.* (a) The master shall not authorize or permit the carrying of any lights not required by law that in any way will interfere with the distinguishing of the signal lights.

SUBPART 97.25—SEARCHLIGHTS

§ 97.25–1 *Improper use prohibited.* (a) No person shall flash or cause to be flashed the rays of a searchlight or other blinding light onto the bridge or into the pilothouse of any vessel under way.

SUBPART 97.27—LOOKOUTS

§ 97.27–1 *Lookouts required.* (a) All ocean and coastwise vessels shall have a lookout at all times at or near the bow during the nighttime.

§ 97.27–5 *Master's and officer's responsibility.* (a) Nothing in this subpart shall exonerate any master or officer in command from the consequences of any neglect to keep a proper lookout or to maintain a proper fire watch or from any neglect of any precaution which may be required by the ordinary practice of seamen or by the special circumstances of the case. When circumstances require it, additional watches shall be maintained to guard against fire or other danger and to give an alarm in case of accident or disaster.

SUBPART 97.30—REPORTS OF ACCIDENTS, REPAIRS, AND UNSAFE EQUIPMENT

§ 97.30–1 *Repairs to boilers and pressure vessels.* (a) Before making any repairs to boilers or unfired pressure vessels, the chief engineer shall submit a report covering the nature of the repairs to the Officer in Charge, Marine Inspection, at or nearest to the port where the repairs are to be made.

§ 97.30–5 *Accidents to machinery.* (a) In the event of an accident to a boiler, unfired pressure vessel, or machinery tending to render the further use of the item unsafe until repairs are made, or if by ordinary wear such items become unsafe, a report shall be made, by the chief engineer immediately to the Officer in Charge, Marine Inspection, or if at sea, immediately upon arrival at port.

§ 97.30–10 *Notice required before repair.* (a) No repairs or alterations, except in an emergency, shall be made to any lifesaving or fire detecting or extinguishing equipment without advance notice to the Officer in Charge,

Marine Inspection. When emergency repairs or alterations have been made, notice shall be given to the Officer in Charge, Marine Inspection, as soon as practicable.

§ 97.30–15 *Fusible plugs.* (a) It shall be the duty of the chief engineer to report the installation of new fusible plugs to the Officer in Charge, Marine Inspection, on Form CG 945, in accordance with § 61.45–20 of Subchapter F (Marine Engineering) of this chapter.

SUBPART 97.33—CABLE TRAVELER

§ 97.33–1 *When required.* (a) On vessels where the distance between deck houses is more than 150 feet, a wire cable shall be stretched between the deck houses at all times when the vessel is navigating in other than protected waters. As many loose rings with lanyards shall be attached as deemed necessary by the master. In any case, a properly constructed raised catwalk or raised bridge or a below deck passage may be substituted for the required cable.

SUBPART 97.35—LOG BOOK ENTRIES

§ 97.35–1 *Log book and records.* (a) Under the various statutes, vessels engaged in all trades, with the exception of vessels engaged exclusively in trade on rivers of the United States, are required to maintain an official log book. The official log book, which is furnished gratuitously to masters of all vessels by the Coast Guard, shall be used in making the entries required by this subchapter in the case of vessels making foreign or intercoastal voyages. On other vessels, this log book, or any other form which represents the official log book, may be used for this purpose. With respect to vessels in this latter category, the official log book shall be available for review by the inspector for a period of at least one year after the date to which such records refer.

§ 97.35–5 *Actions required to be logged.* (a) The actions and observations noted in this section shall be entered in the official log book. This section contains no requirements which are not made in other portions of this subchapter, the items being merely grouped together for convenience.

(1) Fire and Boat Drills. Weekly. See § 97.15–35.

(2) Steering Gear, Whistle, and Means of Communication. Prior to departure. See § 97.15–1.

(3) Drafts and Load Line Markings. Prior to leaving port, ocean, coastwise, and Great Lakes services only. See § 97.15–5.

(4) Hatches and other openings. All openings and closings, or leaving port without closing. Except vessels on protected waters. See § 97.15–20.

(5) Line Throwing Appliances. Once every 3 months. See § 97.15–25.

(6) Emergency Lighting and Power Systems. Weekly and semi-annually. See § 97.15–30.

(7) Electric Power Operated Lifeboat Winches. Once every 3 months. See § 97.17–40.

§ 97.35–10 *Official log entries.* (a) In addition to other items required to be entered into the official log book, on vessels where an official log book is required, all items relative to the crew and passengers and to casualties shall be entered as required by R. S. 4290, as amended, 46 U. S. C. 201.

SUBPART 97.37—MARKINGS FOR FIRE AND EMERGENCY EQUIPMENT, ETC.

§ 97.37–1 *Application.* (a) The provisions of this subpart, with the exception of § 97.37–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 97.37–90.

§ 97.37–3 *General.* (a) It is the intent of this subpart to provide such markings as are necessary for the guidance of the persons on board in case of an emergency. In any specific case, and particularly on small vessels, where it can be shown to the satisfaction of the Officer in Charge, Marine Inspection, that the prescribed markings are unnecessary for the guidance of the persons on board in case of emergency, such markings may be modified or omitted.

(b) In addition to English, all stateroom notices, directional signs, etc., shall be printed in languages appropriate to the service of the vessel or other action be taken to achieve the same purpose.

(c) Where in this subpart red letters are specified, letters of a contrasting color on a red background will be accepted.

§ 97.37–5 *General alarm bell switch.* (a) The general alarm bell switch in the pilothouse shall be clearly and permanently identified by lettering on a metal plate or with a sign in red letters on a suitable background: "GENERAL ALARM."

§ 97.37–7 *General alarm bells.* (a) All general alarm bells shall be identified by red lettering at least ½ inch high: "GENERAL ALARM — WHEN BELL RINGS GO TO YOUR STATION."

§ 97.37–9 *Carbon dioxide alarm.* (a) All carbon dioxide alarms shall be conspicuously identified: "WHEN ALARM SOUNDS—VACATE AT ONCE. CARBON DIOXIDE BEING RELEASED."

§ 97.37–10 *Fire extinguishing system branch lines.* (a) The branch line valves of all fire extinguishing systems shall be plainly and permanently marked indicating the spaces served.

§ 97.37–13 *Fire extinguishing system controls.* (a) The control cabinets or spaces containing valves or manifolds for the various fire extinguishing systems shall be distinctly marked in conspicuous red letters at least 2 inches high: "STEAM FIRE APPARATUS," "CARBON DIOXIDE FIRE APPARATUS," "FOAM FIRE APPARATUS," or "WATER SPRAY FIRE APPARATUS" as the case may be.

§ 97.37–15 *Fire hose stations.* (a) Each fire hydrant shall be identified in red letters and figures at least two inches high "FIRE STATION NO. 1," "2," "3," etc. Where the hose is not stowed in the open or behind glass so as to be readily seen, this identification shall be so placed as to be readily seen from a distance.

§ 97.37–20 *Self-contained breathing apparatus and gas masks.* (a) Lockers or spaces containing self-contained breathing apparatus shall be marked "SELF-CONTAINED BREATHING APPARATUS."

§ 97.37–23 *Hand portable fire extinguishers.* (a) Each hand portable fire extinguisher shall be marked with a number and the location where stowed shall be marked with a corresponding number at least ½ inch high. Where only one type and size of hand portable fire extinguisher is carried, the numbering may be omitted.

§ 97.37–25 *Emergency lights.* (a) All emergency lights shall be marked with a letter "E" at least ½ inch high.

§ 97.37–33 *Instructions for changing steering gear.* (a) Instructions in at least ½-inch letters and figures shall be posted in the steering engine room, relating in order, the different steps to be taken in changing to the emergency steering gear. Each clutch, gear, wheel, lever, valve, or switch which is used during the changeover shall be numbered or lettered on a metal plate or painted so that the markings can be recognized at a reasonable distance. The instructions shall indicate each clutch or pin to be "in" or "out" and each valve or switch which is to be "opened" or "closed" in shifting to any means of steering for which the vessel is equipped. Instructions shall be included to line up all steering wheels and rudder amidship before changing gears.

§ 97.37–35 *Rudder orders.* (a) At all steering stations, there shall be installed a suitable notice on the wheel or device or in such other position as to be directly in the helmsman's line of vision, to indicate the direction in which the wheel or device must be turned for "right rudder" and for "left rudder."

§ 97.37–37 *Lifeboats.* (a) The name of the vessel shall be plainly marked or painted on each side of the bow of each lifeboat in letters not less than 3 inches high.

(b) The number of each lifeboat shall be plainly marked or painted on each side of the bow of each lifeboat in figures not less than 3 inches high. The lifeboats on each side of the vessel shall be numbered from forward aft, with the odd numbers on the starboard side.

(c) The cubical contents and number of persons allowed to be carried in each lifeboat shall be plainly marked or painted on each side of the bow of each lifeboat in letters and numbers not less than 1½ inches high. In addition, the number of persons allowed shall be plainly marked or painted on top of at least 2 thwarts in letters and numbers not less than 3 inches high.

(d) All oars and removable air tanks shall be conspicuously marked with the vessel's name.

(e) Where mechanical disengaging apparatus is used, the control effecting the release of the lifeboat shall be painted bright red and shall have thereon in raised letters the words "DANGER—LEVER RELEASES HOOKS."

§ 97.37–40 *Life rafts.* (a) Life rafts, together with their oars and paddles, shall be conspicuously marked with the vessel's name.

(b) The number of persons allowed on each life raft shall be conspicuously marked or painted thereon in letters and numbers at least 1½ inches high.

§ 97.37–43 *Life preservers and ring life buoys.* (a) All life preservers, wood floats, and ring life buoys shall be marked with the vessel's name.

§ 97.37–45 *Fire hose and axes.* (a) All fire hose and axes shall be marked with the vessel's name.

§ 97.37–47 *Portable magazine chests.* (a) Portable magazine chests shall be marked in letters at least 3 inches high: "PORTABLE MAGAZINE CHEST—INFLAMMABLE—KEEP LIGHTS AND FIRE AWAY."

§ 97.37–90 *Vessels contracted for prior to November 19, 1952.* (a) Vessels contracted for prior to November 19, 1952, shall meet the requirements of this paragraph.

(1) The requirements of §§ 97.37–5 through 97.37–47 shall be met with the exception that existing signs and markings containing the same general intent, but not necessarily identical wording or exact letter type, size, or color, may be retained so long as they are in good condition to the satisfaction of the Officer in Charge, Marine Inspection.

SUBPART 97.40—MARKINGS ON VESSELS

§ 97.40–1 *Application.* (a) The provisions of this subpart shall apply to all vessels except as specifically noted.

§ 97.40–5 *Markings required by Customs Regulations.* (a) The following markings are required by the Customs Regulations. Details of the application of the requirements as well as details of the required markings will be found in those regulations.

(1) *Name of vessel.* On both bows and the stern (yachts excepted), and on steam vessels the name is also required on both sides of the pilothouse, and on steam paddle wheel vessels on the outer side of each paddle box. Yachts shall have the name on the hull.

(2) *Hailing port.* On the stern.

(3) *Draft marks.* On the stem and stern. Also see § 97.40–10.

(4) *Official number.* On the vessel's main beam.

(5) *Net tonnage.* On the vessel's main beam.

§ 97.40–10 *Draft marks.* (a) All vessels 50 gross tons and over, under the jurisdiction of the U. S. Coast Guard, shall have the draft of the vessel plainly and legibly marked upon the stem and upon the sternpost or rudderpost or at any place at the stern of the vessel as may be necessary for easy observance. The draft shall be taken from the bottom of the keel at the marks to the surface of the water, the bottom of the mark to indicate the draft in feet.

(b) In cases where the keel does not extend forward or aft to the location of the draft marks, due to raked stem or cut-away skeg, the datum line from which the draft shall be taken shall be obtained by projecting the line of the bottom of keel forward or aft, as the case may be, to the location of the draft marks.

(c) In cases where a vessel may have a skeg or other appendage extending locally below the line of the keel, the draft at the end of the vessel adjacent to such appendage shall be measured to a line tangent to the lowest part of such appendage and parallel to the line of the bottom of the keel.

§ 97.40–15 *Load line marks.* (a) Vessels assigned a load line shall have the deck line and the load line marks permanently scribed or embossed as required by Subchapter E (Load Lines) of this chapter.

SUBPART 97.43—PLACARD OF BREECHES BUOY INSTRUCTIONS

§ 97.43–1 *Application.* (a) The provisions of this subpart shall apply to all vessels on an international voyage and all other vessels of 150 gross tons and over in ocean, coastwise, or Great Lakes service.

§ 97.43–5 *Where posted.* (a) A placard containing instructions for the use of breeches buoys, Form CG 811, shall be posted in the pilothouse, the engine room, and the crew quarters of all vessels.

SUBPART 97.45—CARRYING OF EXCESS STEAM

§ 97.45–1 *Master and chief engineer responsible.* (a) It shall be the duty of the master and the engineer in charge of the boilers of any vessel to see that a steam pressure is not carried in excess of that allowed by the certificate of inspection, and to see that the safety valves, once set and sealed by the inspector, are in no way tampered with or made inoperative except as provided in § 57.10–20 (b) (3) of Subchapter F (Marine Engineering) of this chapter.

SUBPART 97.47—ROUTING INSTRUCTIONS

§ 97.47–1 *All persons must comply.* (a) Due to existing mine field dangers, all licensed masters, officers, and certificated seamen on United States vessels shall comply strictly with the routing instructions issued by competent naval authority. Failure to comply with such routing instructions shall be deemed misconduct within the meaning of R. S. 4450, as amended (46 U. S. C. 239). Nothing herein shall be construed as relieving the master of the responsibility for the safety of his vessel.

SUBPART 97.50—COMPLIANCE WITH PROVISIONS OF CERTIFICATE OF INSPECTION

§ 97.50–1 *Master or person in charge responsible.* (a) It shall be the duty of the master or other person in charge of the vessel to see that all of the provisions of the certificate of inspection are strictly adhered to. Nothing in this subpart shall be construed as limiting the master or other person in charge of the vessel, at his own responsibility, from diverting from the route prescribed in the certificate of inspection or taking such other steps as he deems necessary and prudent to assist vessels in distress or for other similar emergencies.

SUBPART 97.53—EXHIBITION OF LICENSE

§ 97.53–1 *Licensed officers.* (a) All licensed officers on a vessel shall have their licenses conspicuously displayed as required by R. S. 4446, 46 U. S. C. 232.

PART 98—FERRYBOATS

Part 98 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 99—EXCURSION STEAMERS

Part 99 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 100—BARGES

Part 100 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 101—DUTIES OF INSPECTORS

Part 101 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 102—BAY, SOUND AND LAKE STEAM YACHTS

Part 102 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter J—Electrical Engineering

Chapter I is amended by changing the title of Subchapter J from "Rivers; General Rules and Regulations" to "Electrical Engineering" and by adding a new Part 110 reading as follows:

PART 110—GENERAL PROVISIONS

SUBPART 110.01—BASIS AND PURPOSE OF REGULATIONS

Sec.

110.01–1 Purpose of regulations.
110.01–5 Assignment of functions.
110.01–10 Authority for regulations.

SUBPART 110.05—APPLICATION

110.05–1 Vessels subject to the requirements of this subchapter.
110.05–5 Specific application noted in text.

SUBPART 110.10—REFERENCE SPECIFICATIONS, STANDARDS, AND CODES

110.10–1 General.
110.10–5 Copies of specifications, standards, and codes.

SUBPART 110.15—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

110.15–1 Approved.
110.15–5 Boat deck.
110.15–10 Bulkhead deck.
110.15–15 Cable terms.
110.15–20 Coast Guard District Commander.
110.15–25 Coastwise.
110.15–30 Commandant.
110.15–35 Control equipment terms.
110.15–40 Corrosion-resistant finishes.
110.15–45 Corrosion-resistant materials.
110.15–50 Electrochemistry.
110.15–55 Embarkation deck.
110.15–60 Emergency squad.
110.15–65 Equipment enclosure terms.
110.15–70 Equivalent.
110.15–75 Ferry.
110.15–80 Flash point.

Sec.
110.15–85 Generation and distribution terms.
110.15–90 Great Lakes.
110.15–95 Headquarters.
110.15–100 Instrument and meter terms.
110.15–105 International voyage.
110.15–110 Lakes, bays, and sounds.
110.15–115 Location.
110.15–120 Marine inspector or inspector.
110.15–125 Motorboat.
110.15–130 Ocean.
110.15–135 Officer in Charge, Marine Inspection.
110.15–140 Passenger.
110.15–145 Passenger vessel.
110.15–150 Pilot rules.
110.15–155 Propulsion engine.
110.15–160 Qualified person.
110.15–165 Rivers.
110.15–170 Recognized classification society.
110.15–175 Rotating machinery; enclosure, ventilation and protection terms.
110.15–180 Short international voyage.
110.15–185 Switching equipment.
110.15–190 Vessel.
110.15–195 Western rivers.

SUBPART 110.20—EQUIVALENTS

110.20–1 Conditions under which equivalents may be used.

SUBPART 110.25—SPECIAL PROVISIONS

110.25–1 Vessels acquired or documented under the Act of June 6, 1941.
110.25–5 Installations of equipment made during the Unlimited National Emergency declared by the President on May 27, 1941.

AUTHORITY: §§ 110.01–1 to 110.25–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4426, 4427, 4433, 4453, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1384, 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 392, 399, 404, 405, 411, 435, 366, 395, 363, 369, 367, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 110.01—BASIS AND PURPOSE OF REGULATIONS

§ 110.01–1 *Purpose of regulations.* (a) The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for electrical apparatus and equipment when installed on various types of vessels in accordance with the intent of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various international conventions for safety of life at sea and other treaties which contain requirements regarding electrical apparatus or equipment. The regulations are necessary to implement the various provisions of law promulgated for the purpose of improving or promoting safety of life at sea.

§ 110.01–5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950, effective July 31, 1950 (15 F. R. 4935, 5 U. S. C. note under 241), the functions formerly vested in the Commandant, United States Coast Guard, were transferred to the Secretary of the Treasury with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 110.01–10 *Authority for regulations*—(a) *General.* (1) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375 and 416), as well as in other provisions of Title 52 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) *Passenger vessels.* (1) The regulations regarding electrical apparatus and equipment which may be used on passenger vessels interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4426, 4433, and 4453, as amended, section 14, 29 Stat. 690, section 10, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1384, 1544, section 3, 54 Stat. 346, section 2, 54 Stat. 1028, and section 5, 55 Stat. 244, 245, as amended (46 U. S. C. 361, 362, 391, 392, 399, 404, 411, 435, 366, 395, 363, 369, 367, 463a, 1333, and 50 U. S. C. App. 1275).

(c) *Cargo and miscellaneous vessels.* (1) The regulations regarding electrical apparatus and equipment which may be installed on cargo and miscellaneous vessels interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4426, 4427, 4433, and 4453, as amended, section 14, 29 Stat. 690, section 10, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1544, section 2, 54 Stat. 1028, and section 5, 55 Stat. 244, 245, as amended (46 U. S. C. 361, 362, 391, 392, 399, 404, 405, 411, 435, 366, 395, 363, 367, 463a and 50 U. S. C. App. 1275).

(d) *Uninspected vessels.* (1) The regulations regarding electrical apparatus and equipment which may be installed on uninspected vessels interpret or apply section 17, 54 Stat. 166, as amended (46 U. S. C. 526p).

(e) *Exemptions.* (1) Public vessels owned by the United States, other than those engaged in commercial service, are to be exempt from the regulations in this subchapter. Certain other vessels may be exempt from the requirements of the regulations in this subchapter when so provided by law.

SUBPART 110.05—APPLICATION

§ 110.05–1 *Vessels subject to the requirements of this subchapter.* (a) This subchapter shall be applicable to all vessels as indicated in columns 4 and 5 of Table 110.05–1, and shall apply to all such United States flag vessels, and to all foreign vessels which carry passengers from any port in the United States to the extent prescribed by law, except as follows:

(1) Any vessel of a foreign nation signatory to the International Convention for Safety of Life at Sea, 1948, and which has on board a current, valid safety certificate.

(2) Any vessel of a foreign nation having inspection laws approximating those of the United States together with reciprocal inspection arrangements with the United States, and which has on board a current, valid certificate of inspection issued by its government under such arrangements.

(3) Any vessel operating exclusively on inland waters which are not navigable waters of the United States.

(4) Any vessel laid up and dismantled and out of commission.

(5) With the exception of vessels of the U. S. Maritime Administration, any vessel with the title vested in the United States and which is used for public purposes.

§ 110.05–5 *Specific application noted in text.* At the beginning of the various parts, subparts, and sections, a more specific application is generally given for particular portions of the text involved. This application sets forth the types, sizes or services of vessels to which the text pertains, and in many cases limits the application of the text to vessels contracted for before or after a specific date. As used in this subchapter, the term "vessel contracted for" includes not only the contracting for the construction of a vessel, but also the contracting for a material alteration to a vessel, the contracting for the conversion of a vessel to a passenger vessel, and the changing of service or route of a vessel if such change increases or modifies the general requirements for the vessel or increases the hazards to which it might be subject.

SUBPART 110.10—REFERENCE SPECIFICATIONS, STANDARDS, AND CODES

§ 110.10–1 *General.* The following specifications, standards, and codes, to the extent specified in the text, form a part of this subchapter:

(a) Rules for the Classification and Construction of Steel Vessels, of issue in effect on the date the vessel is contracted for, issued by American Bureau of Shipping, 45 Broad Street, New York 4, N. Y.

(b) Publications of issue in effect on the date the vessel is contracted for, issued by National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass., as listed in this paragraph.

(1) The National Electrical Code.

(2) Recommended Safe Practice for Hospital Operating Rooms.

(c) Standards of issue in effect on the date the vessel is contracted for, issued by National Electrical Manufacturers Association, 155 East Forty-fourth Street, New York 17, N. Y., as listed in this paragraph.

(1) NEMA Large Air Circuit Breaker Standards.

(d) Standards of issue in effect on the date the vessel is contracted for, issued by the American Institute of Electrical Engineers, 33 West Thirty-ninth Street, New York 18, N. Y., as listed in this paragraph.

(1) AIEE Standard No. 45—Recommended Practice for Electrical Installations on Shipboard.

(2) American Standard Definitions of Electrical Terms, ASA C42.

(e) Standards issued by Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago 11, Illinois, as listed in this para-

TABLE 110.05-1

Method of propulsion	Size or other limitations	Classes of vessels (including motorboats) examined or inspected under various Coast Guard regulations			
		Vessels inspected and certificated under Subchapter D, Regulations for Tank Vessels [1]	Vessels inspected and certificated under Subchapter H, Regulations for Passenger Vessels [1] [2]	Vessels inspected and certificated under Subchapter I, Regulations for Cargo and Miscellaneous Vessels [1] [2]	Vessels subject to provisions of Subchapter C, Regulations for Uninspected Vessels [1] [2] [3]
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Steam	Vessels 40 feet in length and under.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tug boats and tow boats.	All vessels except those covered by Subchapters D and I.
	Vessels over 40 but not over 65 feet in length.[4]	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	All tug boats and tow boats.	All vessels except those covered by Subchapters D and I.[5]
	Vessels over 65 feet in length.[6]	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew. 3. Towing and fishing vessels, in other than ocean and coastwise service, issued a permit to carry persons on the legitimate business of the vessel, in addition to the crew, but not to exceed one for each net ton of the vessel.	All vessels except those covered by Subchapters D and H.	None.
Motor	Vessels of not over 15 gross tons.	All vessels carrying combustible or inflammable liquid cargo in bulk.	None	None	All vessels except those covered by Subchapter D.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage, except yachts, and all other vessels carrying passengers for hire except documented cargo vessels over 65 feet in length issued a permit to carry not more than 16 persons in addition to the crew.	All vessels carrying freight for hire except those covered by Subchapters D and H.	All vessels except those covered by Subchapters D, H, and I.
	Seagoing motor vessels of 300 gross tons and over.	All vessels carrying combustible or inflammable liquid cargo in bulk.[6]	All vessels carrying more than 12 passengers on an international voyage except yachts, and all other vessels carrying passengers except: 1. Yachts. 2. Documented cargo vessels issued a permit to carry not more than 16 persons in addition to the crew.	All vessels except those covered by Subchapters D and H, and those engaged in the fishing, oystering, clamming, crabbing, or any other branch of the fishery, kelp, or sponge industry.	All vessels except those covered by Subchapters D, H, and I.
Sail	----------	All vessels carrying combustible or inflammable liquid cargo in bulk.	All vessels over 700 gross tons carrying passengers for hire.	None	None.
Nonself-propelled.	Seagoing barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges 100 gross tons and over carrying passengers.	All barges 100 gross tons and over except those covered by Subchapters D and H.	All barges carrying passengers except those covered by Subchapter H.
	Inland barges	All barges carrying combustible or inflammable liquid cargo in bulk.	All barges over 100 gross tons carrying passengers for hire.	None	All barges carrying passengers except those covered by Subchapter H.

[1] Subchapters E (Load Lines) F (Marine Engineering), and J (Electrical Engineering) of this chapter are also applicable under certain conditions.

[2] Public nautical school ships, other than vessels of the Navy and Coast Guard, shall meet the requirements of Part 167 of Subchapter R (Nautical Schools) of this chapter. Civilian nautical school ships, as defined by 46 U. S. C. 1331, shall meet the requirements of Subchapter H (Passenger Vessels) and Part 168 of Subchapter R (Nautical Schools) of this chapter.

[3] Any vessel on an international voyage is subject to the applicable requirements of the International Convention for Safety of Life at Sea, 1948.

[4] Length measured from end to end over deck, excluding sheer.

[5] Boilers and machinery are subject to examination.

[6] Vessels covered by Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter, where the principal purpose or use of the vessel is not for the carriage of liquid cargo, may be granted a permit to carry a limited amount of combustible liquid cargo in bulk. The portion of the vessel used for the carriage of the combustible liquid cargo shall meet the requirements of Subchapter D (Tank Vessels) in addition to the requirements of Subchapter H (Passenger Vessels) or I (Cargo and Miscellaneous Vessels) of this chapter.

graph, each of issue in effect on the date the vessel is contracted for:

(1) Standard for Snap Switches.

(2) Standard for Knife Switches.

(3) Standard for Fuses.

(4) Standard for Industrial Control Equipment.

(5) Standard for Branch-Circuit and Service Circuit Breakers.

(6) Standard for Panelboards.

(7) Standard for Edison-Base Lampholders.

(8) Standard for Electric Lighting Fixtures and Portable Lamps.

(9) Standard for Attachment Plugs and Receptacles.

(10) Standard for Flexible Cord and Fixture Wire.

(11) Standard for Electric-Discharge-Lamp Accessory Equipment.

(12) Standard for Elevator Electric Contacts and Elevator Hoistway Door Interlocks.

(f) Specifications issued by the United States Coast Guard.

(1) United States Coast Guard Specification for Electrical Installations on Merchant Vessels, dated August 31, 1944, revised March 6, 1945.

(g) Standards of issue in effect on the date the vessel is contracted for, issued by American Standards Association, 70 East Forty-fifth Street, New York 17, New York.

(1) Safety Code for Elevators, Dumbwaiters, and Escalators.

§ 110.10-5 *Copies of specifications, standards and codes.* (a) Copies of the specifications, standards, and codes referred to in this subpart may be obtained from the issuing authority.

(b) Copies of the specifications, standards, and codes referred to in this subpart are available for reading purposes at Coast Guard Headquarters upon request.

SUBPART 110.15—DEFINITION OF TERMS USED IN THIS SUBCHAPTER

§ 110.15-1 *Approved.* This term means approved by the Commandant, United States Coast Guard, unless otherwise stated.

§ 110.15-5 *Boat deck.* This term means the deck or decks on which lifeboats are stowed.

§ 110.15-10 *Bulkhead deck.* This term means the uppermost deck up to which the transverse watertight bulkheads are carried.

§ 110.15-15 *Cable terms*—(a) *Cable.* (1) A cable is either a stranded conductor (single-conductor cable) or a combination of conductors insulated from

one another (multiple-conductor cable). (ASA C42 35.80.005.)

(b) *Cable designations.* (1) Abbreviations given in Columns 1 to 5, inclusive, of Table 110.10–15 (b) (1) may be employed in connection with lighting and power, interior communication, and telephone cable. Thus, in the abbreviation DRL–4, D=double conductor, light and power (column 1), R=rubber insulated (column 2), L=leaded and steel armored (columns 3 and 4), and—4=No. 14 American wire gage, 4110 circular mils (column 5). In the abbreviation ICTIA–12, IC=interior communication (column 1), T=thermoplastic-asbestos or thermoplastic-glass-asbestos insulated (column 2), I=impervious sheathed (column 3), A=Aluminum armored (column 4), and —12=12 conductor (column 5).

TABLE 110.15-15 (b) (1)—LIGHTING AND POWER, INTERIOR COMMUNICATION, AND TELEPHONE CABLE SYMBOLS

Column 1 Symbol designating cable type	Column 2 Symbol designating type of insulation	Column 3 Symbol designating type of outer covering	Column 4 Symbol designating type of armor	Column 5 Symbol designating wire size for light and power cables or number of conductors for interior communication or telephone cable
S=single conductor, light and power. D=double conductor, light and power. T=triple conductor, light and power. F=four conductor, light and power. IC=interior communication. TT=twisted pair, telephone. TTC=twisted pair, inter-cabin telephone.	R=rubber. V=varnished-cambric. AV=asbestos-varnished-cambric. T=thermoplastic-asbestos or thermoplastic-glass-asbestos.	A=armored only. L=leaded and armored. I=impervious sheathed and armored. S=reinforced sheathed and armored.	None=steel. A=aluminum. B=bronze.	Wire size in nearest 1,000 circular mils or number of conductors.

(2) The trade designations given in Table 110.15–15 (b) (2) may be used to designate the type of flexible cord and fixture wire.

TABLE 110.15-15(b)(2)—FLEXIBLE CORD AND FIXTURE WIRE SYMBOLS

Trade name of wire or cord	Designation
Asbestos-covered heat-resistant fixture wire	AF
Cotton-covered heat-resistant fixture wire	CF
Rubber-covered fixture wire	RF-2
Flexible rubber-covered fixture wire	FF-2
Rubber-covered heat-resistant fixture wire	RFH-2
Rubber-covered heat-resistant flexible stranding fixture wire	FFH-2
Thermoplastic-covered fixture wire	TF
Thermoplastic-covered flexible stranding fixture wire	TFF
Braided moisture-proof reinforced cord	PW-2
Braided lamp cord	C
Braided twisted portable cord	PD
Braided reinforced cord	P-2
Braided heavy duty cord	K
Junior hard service cord	SJ
Junior hard service oil resistant cord	SJO
Junior hard service thermoplastic insulated cord	SJT
Asbestos and varnished cloth covered heat-resistant cord	AVPD
Hard service cord	S
Hard service cord, thermoplastic covered	ST
Hard service cord, oil resistant	SO
Hard service cord	SJ
Hard service cord, oil resistant	SJO

§ 110.15–20 *Coast Guard District Commander.* This term means an officer of the Coast Guard designated as such by the Commandant to command all Coast Guard activities within his district, which includes the inspection, enforcement, and administration of Title 52, Revised Statutes, and Acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 110.15–25 *Coastwise.* Under this designation shall be included all vessels normally navigating the waters of any ocean or the Gulf of Mexico 20 nautical miles or less offshore.

§ 110.15–30 *Commandant.* This term means the Commandant of the Coast Guard.

§ 110.15–35 *Control equipment terms*—(a) *Electric controllers.* An electric controller is a device, or group of devices, which serve to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (ASA C42 25.05.005)

(b) *Basic functions.* The basic functions of a controller are acceleration, retardation, line closing, reversing, etc. (ASA C42 25.05.010)

(c) *Manual controller.* A manual controller is an electric controller having all of its basic functions performed by hand. (ASA C42 25.05.025)

(d) *Full magnetic controller.* A full magnetic controller is an electric controller having all its basic functions performed by electromagnets. (ASA C42 25.05.030)

(e) *Contactor.* A contactor is a device, operated other than by hand, for repeatedly establishing and interrupting an electric power circuit. (ASA C42 25.05.050)

(f) *Starter.* A starter is an electric controller for accelerating a motor from rest to normal speed. (ASA C42 25.05.075)

(g) *Automatic starter.* An automatic starter is a starter which controls automatically the acceleration of a motor. (ASA C42 25.05.080)

(h) *Autotransformer starter.* An autotransformer starter is a starter having an autotransformer to furnish a reduced voltage for starting. It includes the necessary switching mechanism and is frequently called a compensator or autostarter. (ASA C42 25.05.085)

(i) *Overload protection (overcurrent protection).* Overload protection is the effect of a device operative on excessive current, but not necessarily on short-circuit, to cause and maintain the interruption of current flow to the device governed. (ASA C42 25.10.005)

(j) *Overload relay.* An overload relay is an overcurrent relay in the circuit to a motor and which functions at a predetermined value of overcurrent to cause the disconnection of the motor from the line.

NOTE: An overload relay is intended to protect the motor or controller and does not necessarily protect itself. (ASA C42 25.15.005)

(k) *Normally open and normally closed.* The terms "normally open" and "normally closed" when applied to a magnetically operated switching device, such as a contactor or relay, or to the contacts thereof, signify the position taken when the operating magnet is deenergized. These terms apply only to nonlatching types of devices. (ASA C42 25.20.020)

§ 110.15–40 *Corrosion-resistant finishes.* The following treatments listed in this section when properly done and of sufficiently heavy coating, are considered satisfactory corrosion-resistant finishes:

(a) Electroplating of cadmium, chromium, nickel, silver, or zinc.

(b) Sheradizing.

(c) Galvanizing.

(d) Painting. Thorough cleaning and degreasing followed by bonderizing or the equivalent, followed by the application of zinc chromate primer or the equivalent, followed by one or more applications of enamel.

§ 110.15–45 *Corrosion-resistant materials.* Silver, corrosion-resisting steel, copper, brass, bronze, copper-nickel, certain copper-nickel alloys, and certain aluminum alloys are considered satisfactory corrosion-resistant materials.

§ 110.15–50 *Electrochemistry*—(a) *Storage battery.* A storage battery is a connected group of two or more electrolytic cells for the generation of electric energy in which the cells after being discharged may be restored to a charged condition by an electric current flowing in a direction opposite to the flow of current when the cell discharges.

(b) *Dry cell.* A dry cell is a cell in which the electrolyte exists in the form of a jelly or is absorbed in a porous medium, or is otherwise restrained from flowing from its intended position, such a cell being completely portable and the electrolyte non-spillable. (ASA C42 60.11.020)

(c) *Primary cell.* A primary cell is a cell designed to produce electric current through an electrochemical reaction which is not efficiently reversible and hence the cell, when discharged, cannot be efficiently recharged by an electric current. (ASA C42 60.11.005)

§ 110.15–55 *Embarkation deck.* This term means the deck or decks from which passengers embark into lifeboats or the deck or decks on which passengers are assembled preparatory to embarking into lifeboats.

§ 110.15–60 *Emergency squad.* This term means that part of the crew designated by the station bill to form the nucleus of a damage control party.

§ 110.15–65 *Equipment enclosure terms*—(a) *Enclosed (inclosed).* En-

closed means surrounded by a case which will prevent accidental contact of a person with live parts. (ASA C42 95.90.210).

(b) *Nonwatertight equipment.* Nonwatertight equipment means enclosed equipment, the enclosure of which is not sufficiently effective to be classed as either drip-proof or watertight.

(c) *Drip-proof equipment.* Drip-proof equipment means enclosed equipment so constructed or protected that its sucessful operation is not interfered with when subjected to falling moisture or dirt.

(d) *Watertight equipment.* Watertight equipment means enclosed equipment so constructed that a stream of water from a hose (not less than 1 inch in diameter) under a head of about 35 feet from a distance of about 10 feet, and for a period of 5 minutes, can be played on the apparatus without leakage. The hose nozzle should be adjusted to give a solid stream at the enclosure.

(e) *Explosion-proof equipment.* Explosion-proof equipment means equipment enclosed in a case which is capable of withstanding an explosion of a specified gas or vapor which may occur within it, and of preventing the ignition of the specified gas or vapor surrounding the enclosure by sparks, flashes or explosions of the gas or vapor within.

(f) *Weathertight equipment.* Weathertight equipment means equipment so constructed or protected that exposure to a beating rain will not result in the entrance of water.

§ 110.15–70 *Equivalent.* This term, when used in connection with a unit, material, process, finish, etc., means the equivalent as determined by the Coast Guard.

§ 110.15–75 *Ferry.* Under this designation shall be included those vessels in other than ocean or coastwise service having provisions only for deck passengers and vehicles, operating on a short run on a frequent schedule between two points over the most direct water route, and offering a public service of a type normally attributed to a bridge or tunnel.

§ 110.15–80 *Flash point.* This term indicates the temperature in degrees Fahrenheit at which a liquid gives off an inflammable vapor when heated in an open-cup tester.

§ 110.15–85 *Generation and distribution terms*—(a) *Connected load.* The connected load on a system, is the sum of the continuous ratings of the load consuming apparatus connected to the system, or part of the system, under consideration. (ASA C42 35.10.120)

(b) *Load factor.* Load factor is the ratio of the average load over a designated period of time to the connected load.

(c) *Peak load.* Peak load is the maximum load consumed or produced by a unit or group of units in a stated period of time. It may be the maximum instantaneous load or the maximum average load over a designated interval of time.

NOTE: Maximum average load is ordinarily used. In commercial transactions involving peak load (peak power) it is taken as the average load (power) during a time interval of specified duration occurring within a given period of time, that time interval being selected during which the average power is greatest. (ASA C42 35.10.135)

(d) *Ground (earth).* A ground is a conducting connection, whether intentional or accidental, between an electric circuit or equipment and earth, or to some conducting body which serves in place of the earth. (ASA C42 35.15.005)

NOTE: On shipboard the "ground" or "earth" is the hull and all parts connected thereto.

(e) *Grounded (earthed).* Grounded means connected to earth or to some conducting body which serves in place of the earth. (ASA C42 35.15.010)

(f) *Ground-return circuit (earth-return circuit).* A ground-return circuit is a circuit in which the earth is utilized to complete the circuit. (ASA C42 35.15.015)

(g) *Ground current.* A ground current is any current flowing in the earth.

NOTE: Specifically, currents flowing to earth through ground conductors or currents flowing in conductors embedded in the earth are commonly referred to as ground currents. (ASA C42 35.15.020)

(h) *Voltage to ground.* The voltage to ground is the voltage between any live conductor of a circuit and earth.

NOTE: Where safety considerations are involved, the voltage to ground for ungrounded circuits shall be taken as the highest voltage between the conductors of the circuit. (ASA C42 35.15.025)

(i) *Ground indication.* A ground indication is an indication of the presence of a ground on one or more of the normally ungrounded conductors of a system. (ASA C42 35.15.040)

(j) *Circuit.* A circuit is a conducting part or a system of conducting parts through which an electric current is intended to flow. (ASA C42 35.40.010)

(k) *Feeder (in interior wiring).* A feeder is a set of conductors originating at a main distribution center, and supplying one or more secondary distribution centers, one or more branch-circuit distribution centers, or any combination of these two types of equipment. (ASA C42 95.10.025)

(l) *Lighting feeder.* A lighting feeder is a feeder supplying principally a lighting load. (ASA C42 95.10.030)

(m) *Power feeder.* A power feeder is a feeder supplying principally a power or heating load. (ASA C42 95.10.035)

(n) *Branch circuit.* A branch circuit is that portion of a wiring system extending beyond the final automatic overload protective device of the circuit. (ASA C42 95.10.045)

(o) *Motor branch circuit.* A motor branch circuit is a branch circuit supplying energy only to motors. (ASA C42 95.10.065)

(p) *Lighting branch circuits.* Lighting branch circuits are circuits supplying energy to lighting outlets only (ASA C42 95.10.050). (Lighting branch circuits also may supply portable desk or bracket fans, small heating appliances, motors of ¼ hp and less, and other portable apparatus of not over 660 watts each.)

(q) *Appliance branch circuits.* Appliance branch circuits are circuits supplying energy either to permanently wired appliances or to attachment-plug receptacles, that is, appliance or convenience outlets, or to a combination of permanently wired appliances and additional attachment-plug outlets on the same circuit, such circuits to have no permanently connected lighting fixtures. (ASA C42 95.10.055)

(r) *Outlet.* An outlet is a point on the wiring system at which current is taken to supply fixtures, lamps, heaters, motors, or current-consuming equipment generally.

NOTE: The use of the term outlet for a point in the wiring system where a switch is located is deprecated, unless qualified to make the meaning clear. (ASA C42 95.10.090)

(s) *Lighting outlet.* A lighting outlet is an outlet intended for the direct connection of a lampholder, a lighting fixture or a pendant cord terminating in a lampholder. (ASA C42 95.10.095)

(t) *Receptacle outlet.* A receptacle outlet is an outlet intended to be equipped with one or more receptacles, not of the screw-shell type; or to be provided with one or more points of attachment within one foot intended to receive attachment-plug caps. (ASA C42 95.-10.100)

(u) *Plug (plug adaptor).* A plug is a device, which, by insertion in a receptacle, establishes connection between the conductors of the attached cord and the conductors connected permanently to the receptacle. (ASA C42 95.15.005)

(v) *Appliance.* An appliance is a current-consuming equipment, fixed or portable, such as heating or motor-operated equipment. (ASA C42 95.35.-005)

(w) *Portable appliance.* A portable appliance is an appliance, fixed or portable, served by means of a flexible extension cord and/or attachment plug.

(x) *Accessible (as applied to wiring methods).* Accessible means not permanently closed in by the structure or finish of the ship; capable of being removed without disturbing the ship structure or finish.

(y) *Accessible (as applied to equipment).* Accessible means admitting close approach because not guarded by locked doors, elevation or other effective means. (ASA C42 95.90.310)

§ 110.15–90 *Great Lakes.* Under this designation shall be included all vessels navigating the Great Lakes.

§ 110.15–95 *Headquarters.* This term means the office of the Commandant, U. S. Coast Guard, Washington, D. C.

§ 110.15–100 *Instrument and meter terms*—(a) *Instrument.* An instrument is a device for measuring the present value of the quantity under observation. An instrument may be an indicating instrument or a recording instrument. The term "instrument" is used in two different senses; (1) instrument proper, and (2) to include not only the instrument proper but, in addition, any necessary auxiliary devices, such as shunts, shunt leads, resistors, reactors, capacitors, or instrument transformers. The term "meter" is also used in a general sense to designate any type of measuring

device including all types of electric measuring instruments. Such use as a suffix or as part of a compound word (e. g., voltmeter, frequency meter) is universally accepted. "Meter" may be used alone with this wider meaning when the context is such as to prevent confusion with the narrower meaning of "electricity meter." (ASA C42 30.20.005)

(b) *Indicating instruments.* An indicating instrument is an instrument in which the present value of the quantity measured is indicated by the position of a pointer relative to a scale. (ASA C42 30.20.010)

(c) *Ammeter.* An ammeter is an instrument for measuring electric current. Ammeters are provided with a scale, usually graduated in amperes, milliamperes or microamperes. (ASA C42 30.40.005)

(d) *Frequency meter.* A frequency meter is an instrument for measuring the frequency of an alternating current. (ASA C42 30.40.045)

(e) *Power factor meter.* A power factor meter is an instrument for measuring power factor. Power factor meters are provided with a scale, usually graduated in power factor. (ASA C42 30.40.085)

(f) *Voltmeter.* A voltmeter is an instrument for measuring voltage. Voltmeters are provided with a scale, usually graduated in volts, millivolts or kilovolts. (ASA C42 30.40.205)

(g) *Wattmeter.* A wattmeter is an instrument for measuring electric power. Wattmeters are provided with a scale, usually graduated in watts or kilowatts. (ASA C42 30.40.215)

(h) *Instrument shunt.* An instrument shunt is a particular type of resistor designed to be connected in parallel with the measuring device to extend the current range beyond some particular value for which the instrument is already complete. (ASA C42 30.70.010)

§ 110.15–105 *International voyage.* An international voyage as applied to United States vessels includes voyages between United States ports and ports outside the United States as well as between United States continental ports and ports in the Territory of Alaska, Commonwealth of Puerto Rico, Territory of Hawaii, the Panama Canal Zone, or any other separate portion of the United States constituting a possession or held under protectorate or mandate. However, vessels solely navigating the Great Lakes and their connecting and tributary waters as far east as the exit of the Lachine Canal at Montreal, in the province of Quebec, Canada, shall not be considered as on an international voyage for the purpose of the regulations contained in this subchapter.

§ 110.15–110 *Lakes, bays, and sounds.* Under this designation shall be included all vessels navigating the waters of any of the lakes, bays, or sounds other than the waters of the Great Lakes.

§ 110.15–115 *Locations*—(a) *Corrosive location.* Corrosive locations shall be deemed to be locations exposed to the weather on vessels operating in salt water.

(b) *Damp or wet location.* Damp or wet locations shall be deemed to be locations exposed to the weather, machinery spaces, cargo spaces, refrigerated spaces, galley, laundry, public washrooms or toilets equipped with baths or showers, and similar locations. Areas directly inside of access doors to a weather deck will also be classed as wet locations where the access door is not suitably protected against entrance of rain or spray by an overhanging deck or by other means.

(c) *Dry location.* Dry locations shall be deemed to be passengers' and crew's quarters, pantries, passageways adjacent to quarters, public washrooms and toilets which are not equipped with baths or showers, radio room, gyro room, and chart room.

§ 110.15–120 *Marine inspector or inspector.* These terms mean any person from the civilian or military branch of the Coast Guard assigned under the superintendence and direction of an Officer in Charge, Marine Inspection, or any other person as may be designated for the performance of duties with respect to the inspection, enforcement, and administration of Title 52, R. S., and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 110.15–125 *Motorboat.* This term means any vessel indicated in Columns 4 or 5 of Table 110.05–1, 65 feet in length or less which is propelled by machinery (including steam). The length shall be measured from end to end over the deck excluding sheer. This term includes a boat temporarily or permanently equipped with a detachable motor and any such boat when so propelled is subject to the applicable provisions of the Motorboat Act of April 25, 1940, 46 U. S. C. 526–526t, and the regulations promulgated thereunder. For the purpose of this subchapter, motorboats are included under the term "vessel" unless specifically noted otherwise. The various classes of motorboats are as follows:

Class A—Any motorboat less than 16 feet in length.
Class 1—Any motorboat 16 feet or over and less than 26 feet in length.
Class 2—Any motorboat 26 feet or over and less than 40 feet in length.
Class 3—Any motorboat 40 feet or over and not more than 65 feet in length.

§ 110.15–130 *Ocean.* Under this designation shall be included all vessels navigating the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore.

§ 110.15–135 *Officer in Charge, Marine Inspection.* This term means any person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who, under the superintendence and direction of the Coast Guard District Commander, is in charge of an inspection zone for the performance of duties with respect to the inspections, enforcement, and administration of Title 52, Revised Statutes, and acts amendatory thereof or supplemental thereto, and rules and regulations thereunder.

§ 110.15–140 *Passenger.* A passenger is every person other than the master and members of the crew or other persons employed or engaged in any capacity on board a vessel in the business of that vessel. In the case of a vessel on an international voyage a child under one year of age is not counted as a passenger.

§ 110.15–145 *Passenger vessel.* A passenger vessel is any vessel indicated in column 4 of Table 110.05–1.

§ 110.15–150 *Pilot rules.* (a) The term "pilot rules" means the statutory rules of the road and the implementing regulations of the Commandant. The regulatory pilot rules are contained in 33 CFR Parts 80, 82, 84, 90, 92, 95, and 100.

(b) In accordance with law, the Coast Guard publishes the statutory rules of the road and regulatory pilot rules in pamphlet form as follows:

(1) Rules to Prevent Collisions of Vessels and Pilot Rules for Certain Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico (CG 169).

(2) Pilot Rules of the Great Lakes and Their Connecting and Tributary Waters and the St. Marys River (CG 172).

(3) Pilot Rules for the Western Rivers and the Red River of the North (CG 184).

§ 110.15–155 *Propulsion engine.* This term means one or more machines driving a single propeller or paddlewheel shaft for propulsion of the vessel.

§ 110.15–160 *Qualified person.* One familiar with the construction and operation of the apparatus and the hazards involved. (ASA C42 95.95.025).

§ 110.15–165 *Rivers.* Under this designation shall be included all vessels whose navigation is restricted to rivers and/or canals, exclusively, and to such other waters as may be so designated by the Coast Guard District Commander.

§ 110.15–170 *Recognized classification society.* The term "recognized classification society" means the American Bureau of Shipping or other classification society recognized by the Commandant.

§ 110.15–175 *Rotating machinery; enclosure, ventilation and protection terms*—(a) *Self-ventilated machine.* A self-ventilating machine is one which has its ventilating air circulated by means integral with the machine. (ASA C42 10.25.010)

(b) *Separately ventilated machine.* A separately ventilated machine is one which has its ventilating air supplied by an independent fan or blower external to the machine. (ASA C42 10.25.020)

(c) *Enclosed self-ventilated machine.* An enclosed self-ventilated machine is a machine having openings for the admission and discharge of the ventilating air, which is circulated by means integral with the machine, the machine being otherwise totally enclosed. These openings are so arranged that inlet and outlet ducts or pipes may be connected to them. (ASA C42 10.25.030)

NOTE: Such ducts or pipes, if used, must have ample section and be so arranged as to furnish the specified volume of air to the machine, otherwise the ventilation will not be sufficient.

(d) *Enclosed separately ventilated machine.* An enclosed separately ventilated machine is a machine having openings for the admission and discharge of the ventilating air, which is circulated by means external to and not a part of the machine, the machine being otherwise totally enclosed. These openings are so arranged that inlet and outlet duct pipes may be connected to them. (ASA C42 10.25.040)

(e) *Open machine.* An open machine is a self-ventilated machine having no restriction to ventilation other than that necessitated by mechanical construction. (ASA C42 10.25.050)

NOTE: In the sense of this definition an open machine, when the term is used without qualification, is understood not to be splash-proof or drip-proof.

(f) *Totally enclosed machine.* A totally enclosed machine is one so enclosed as to prevent exchange of air between the inside and the outside of the case, but not sufficiently enclosed to be called airtight. (ASA C42 10.25.060)

(g) *Totally enclosed fan-cooled machine.* A totally enclosed fan-cooled machine is a totally enclosed machine equipped for exterior cooling by means of a fan or fans, integral with the machine but external to the enclosing parts. (ASA C42 10.25.070)

(h) *Protected machine.* A protected machine is one in which all ventilating openings in the frame are protected with wire screen, expanded metal or perforated covers. (ASA C42 10.30.010)

NOTE: A common form of specification for "protected machinery" is: "The openings shall not exceed one-half square inch (323 sq mm) in area and shall be of such shape as not to permit the passage of a rod larger than one-half inch (12.7 mm) in diameter, except where the distance of exposed live parts from the guard is more than 4 inches (101.7 mm) the openings may be three-fourths square inch (484 sq mm) in area and must be of such shape as not to permit passage of a rod larger than three-fourths inch (19 mm) in diameter."

(i) *Drip-proof machine.* A drip-proof machine is one in which the ventilating openings are so constructed that drops of liquid or solid particles falling on the machine at any angle not greater than 15 degrees from the vertical, cannot enter the machine either directly or by striking and running along a horizontal or inwardly inclined surface. (ASA C42 10.30.030)

(j) *Explosion-proof machine.* An explosion-proof machine is one enclosed in a case which is capable of withstanding an explosion of a specified gas or vapor which may occur within it, and of preventing the ignition of the specified gas or vapor surrounding the enclosure by sparks, flashes or explosions of the gas or vapor within.

(k) *Watertight machine.* A watertight machine is a totally enclosed machine so constructed that a stream of water from a hose (not less than 1 inch in diameter) under a head of 35 feet and from a distance of about 10 feet can be played on the machine from any direction for a period of 15 minutes without leakage, except that leakage which may occur around the shaft may be considered permissible, provided it is prevented from entering the oil reservoir and provision is made for automatically draining the machine. The hose nozzle should be adjusted to give a solid stream at the enclosure. The machine should be provided with a check valve for drainage or a tapped hole at the lowest part of the frame which will serve for application of drain pipe or drain plug.

§ 110.15–180 *Short international voyage.* For the purpose of this subchapter, the expression "short international voyage" means an international voyage in the course of which a vessel is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety, and which does not exceed 600 miles in length between the last port of call in the country in which the voyage begins and the final port of destination.

§ 110.15–185 *Switching equipment*—(a) *Switches*—(1) *Switch.* A switch is a device for making, breaking or changing the connections in an electric circuit. (ASA C42 25.05.090)

(2) *Knife switch.* A knife switch is a form of air switch in which the moving element, usually a hinged blade, enters or embraces the contact clips. In some cases, however, the blade is not hinged and is removable. (ASA C42 20.10.050)

(3) *Rated continuous current (of a switch or circuit breaker).* The rated continuous current of a switch or circuit breaker is the designated limit in rms amperes or direct current amperes which it will carry continuously without exceeding the limit of observable temperature rise. (ASA C42 20.10.100)

(4) *Rated voltage (of a switch or circuit breaker).* The rated voltage of a switch or circuit breaker is the highest rms voltage or the highest direct-current voltage at which it is designed to operate. (ASA C42 20.10.105)

(5) *General use switch.* A general use switch is a switch intended for use in general distribution and branch circuits. It is rated in amperes and is capable of interrupting the rated current at the rated voltage. (ASA C42 25.05.105)

(6) *Isolating switch.* An isolating switch is a switch intended for isolating an electric circuit from the source of power. It has no interrupting rating and is intended to be operated only after the circuit has been opened by some other means. (ASA C42 25.05.110)

(7) *Motor-circuit switch.* A motor-circuit switch is a switch intended for use in a motor branch circuit. It is rated in horsepower and is capable of interrupting the maximum operating overload current of a motor of the same rating at the rated voltage. (ASA C42 25.05.120)

(8) *"T" rated switch.* A "T" rated switch is a switch intended to control tungsten-filament lamp loads.

(9) *Master switch.* A master switch is a switch which dominates the operation of contactors, relays or other magnetically operated devices. (ASA C42 25.05.115)

(b) *Interrupting devices*—(1) *Circuit breaker.* A circuit breaker is a device for interrupting a circuit between separable contacts under normal or abnormal conditions. Ordinarily circuit breakers are required to operate only infrequently, although some classes of breakers are suitable for frequent operation. (ASA C42 20.15.005)

NOTE: Normal indicates the interruption of currents not in excess of the rated continuous current of the circuit breaker. Abnormal indicates the interruption of currents in excess of such rated continuous current such as short circuits. In application, circuit breakers are selected whose rated interrupting current is as great or greater than the current which they may be called upon to interrupt.

(2) *Rated interrupting current (rated interrupting capacity).* The rated interrupting current of a circuit breaker is the highest rms current at a specified operating voltage which the breaker is required to interrupt under the operating duty specified and with a normal frequency recovery voltage equal to the specified operating voltage. (ASA C42 20.15.060)

NOTE: The current is the rms value, including the direct-current component, at the instant of contact separation as determined from the envelope of the current wave. Where limited by testing equipment, the maximum tolerance for normal frequency recovery voltage is 15 percent of the specified operating voltage.

(3) *Reverse-power tripping.* Reverse-power tripping signifies the tripping of a circuit breaker upon reversal of power in the main circuit.

NOTE: In d. c. practice the terms "reverse power" and "reverse current" are synonymous.

(4) *Undervoltage tripping.* Undervoltage tripping signifies the tripping of a circuit breaker from a trip coil connected in shunt to the main circuit and responsive to a decrease in the main-circuit voltage. (ASA C42 20.15.120)

(5) *Nonautomatic tripping.* Nonautomatic tripping is the opening of a circuit breaker only in response to an act of an operator (ASA C42 20.15.140)

(c) *Fuses*—(1) *Fuse.* A fuse is an overcurrent protective device with a circuit opening fusible member directly heated and destroyed by the passage of overcurrent through it. (ASA C42 20.20.005)

(2) *Voltage rating.* The voltage rating of a fuse is the rms alternating-current voltage or the direct-current voltage, at which it is designed to operate. (ASA C42 20.20.025)

(3) *Current rating.* The current rating of a fuse is the designated rms alternating current or the direct current which the fuse will carry under the conditions specified. (ASA C42 20.20.030)

(d) *Relays*—(1) *Relay.* A relay is a device that is operative by a variation in the conditions of one electric circuit to effect the operation of other devices in the same or another electric circuit. (ASA C42 20.25.005)

NOTE: Where relays operate in response to changes in more than one condition, all functions should be mentioned.

(2) *Current relay.* A current relay is a relay which functions at a predetermined value of current. It may be an overcurrent relay, an undercurrent relay, or a combination of both. (ASA C42 20.25.095)

(3) *Overload relay.* An overload relay is an overcurrent relay. (ASA C42 20.25.-210)

(4) *Voltage relay.* A voltage relay is a relay which functions at a predetermined value of voltage. It may be an overvoltage relay, an undervoltage relay, or a combination of both. (ASA C42 20.25.360)

(5) *Instantaneous.* Instantaneous is a qualifying term indicating that no delay is purposely introduced in the action of the device. (ASA C42 20.25.400)

(6) *Inverse time.* Inverse time is a qualifying term indicating that there is purposely introduced a delayed action, which delay decreases as the operating force increases. (ASA C42 20.25.405)

(7) *Overcurrent protection (overload protection).* Overcurrent protection is the effect of a device operative on excessive current to cause and maintain the interruption or reduction of current flow to the equipment governed. (ASA C42 20.25.465)

(8) *Undervoltage protection (lowvoltage protection).* Undervoltage or lowvoltage protection is the effect of a device operative on the reduction or failure of voltage to cause and maintain the interruption of power in the main circuit. (ASA C42 20.25.505)

(9) *Undervoltage release (lowvoltage release).* Undervoltage or lowvoltage release is the effect of a device operative on the reduction or failure of voltage to cause the interruption of power in the main circuit, but not to prevent the reestablishment of the main circuit on return of voltage. (ASA C42 20.25.510)

(10) *Overspeed protection.* Overspeed protection is the effect of a device operative on speed of rotating equipment in excess of a predetermined rate to cause and maintain the interruption of power to the protected equipment. (ASA C42 20.25.530)

(e) *Regulators*—(1) *Regulator.* A regulator is a device which functions to maintain a designated characteristic at a predetermined value, or to vary it according to a predetermined plan. (ASA C42 20.40.005)

(2) *Generator voltage regulator.* A generator voltage regulator is a regulator which functions to maintain the voltage of a synchronous generator, condenser, motor, or of a direct-current generator, at a predetermined value, or vary it according to a predetermined plan. (ASA C42 20.40.010)

(f) *Switchgear assemblies*—(1) *Power switchboard.* A power switchboard is that part of switchgear which consists of one or more panels upon which are mounted the switching control, meters, protective and regulatory equipment. The panel or panel supports may also carry the main switching and interrupting devices together with their connections. (ASA C42 20.50.005)

(2) *Live-front switchboards.* A live-front switchboard is a switchboard having live parts on the front of the panels. (ASA C42 20.50.010)

(3) *Dead-front switchboard.* A dead-front switchboard is a switchboard having no live parts on the front of the panels. (ASA C42 20.50.015)

(4) *Distribution switchboard.* A distribution switchboard is a power switchboard used for the distribution of electric energy at the voltages common for such distribution within a ship.

NOTE: Knife switches, air circuit breakers, and fuses are generally used for circuit interruption on distribution switchboards, and voltages seldom exceed 600. However, such switchboards often include switchboard equipment for a high tension incoming supply circuit and a stepdown transformer.

(5) *Automatic transfer equipment.* An automatic transfer equipment is an equipment which automatically transfers a load so that a source of power may be selected from one of several incoming lines. (ASA C42 20.50.445)

§ 110.15–190 *Vessel.* Where the word "vessel" is used in this subchapter, it shall be considered to include all vessels indicated in columns 4 and 5 of Table 110.05–1, except as otherwise noted.

§ 110.15–195 *Western rivers.* For the purpose of this subchapter, the term "Western Rivers" is as defined in CG–184, "Pilot Rules for the Western Rivers and the Red River of the North."

SUBPART 110.20—EQUIVALENTS

§ 110.20–1 *Conditions under which equivalents may be used.* (a) Where in this subchapter it is provided that a particular fitting, appliance, apparatus, or equipment, or type thereof, shall be fitted or carried in a vessel, or that any particular arrangement shall be adopted, the Commandant may accept in substitution therefor any other fitting, apparatus, or equipment, or type thereof, or any other arrangement: *Provided,* That he shall have been satisfied by suitable trials that the fitting, appliance, apparatus, or equipment, or type thereof, or the arrangement shall be at least as effective as that specified in this subchapter.

(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment, apparatus, or arrangement is unreasonable or impracticable, the Commandant may permit the use of alternate equipment, apparatus, or arrangement to such an extent and upon such condition as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subchapter.

SUBPART 110.25—SPECIAL PROVISIONS

§ 110.25–1 *Vessels acquired or documented under the act of June 6, 1941.* (a) Vessels acquired or documented under the act of June 6, 1941, shall be subject to the applicable provisions of Title 52 of the Revised Statutes, acts amendatory thereto and the rules and regulations thereunder.

(b) Unapproved lifesaving, fire fighting, and other equipment may be continued in service so long as, in the opinion of the Officer in Charge, Marine Inspection, such equipment is in good and serviceable condition. All replacements shall be in accordance with Coast Guard requirements for new vessels.

§ 110.25–5 *Installations of equipment made during the Unlimited National Emergency declared by the President on May 27, 1941.* Boilers, pressure vessels, machinery, piping, electrical, and other installations, including lifesaving, fire fighting, and other safety equipment, installed on vessels during the Unlimited National Emergency declared by the President on May 27, 1941, and prior to the termination of Title V of the Second War Powers Act, as extended (sec. 501, 56 Stat. 180, 50 U. S. C., App. Sup. 635), which do not fully meet the detail requirements of the regulations in this chapter, may be continued in service if found to be satisfactory by the Commandant for the purpose intended.

PART 111—ELECTRICAL SYSTEM; GENERAL REQUIREMENTS

Chapter I is amended by adding a new Part 111 in Subchapter J, reading as follows:

SUBPART 111.01—APPLICATION

Sec.
111.01–1 General.
111.01–5 Should, meaning of.

SUBPART 111.05—GENERAL REQUIREMENTS

111.05–1 Construction and installation.
111.05–5 Plan approval.
111.05–10 Testing and inspection.
111.05–15 General considerations.
111.05–20 Temperature ratings.
111.05–25 Nature of electrical supply.
111.05–30 Insulation materials.

SUBPART 111.10—GENERATORS

111.10–1 Power requirements.
111.10–5 Prime movers.
111.10–10 Excitation.
111.10–15 Generator construction.
111.10–20 Voltage regulation.
111.10–25 Parallel operation.
111.10–30 Temperature limitations.
111.10–35 Dielectric strength of insulation.
111.10–40 Tests.

SUBPART 111.15—STORAGE BATTERIES

111.15–1 General requirements.
111.15–5 Battery installation and arrangement.
111.15–10 Ventilation.
111.15–15 Protection from corrosion.
111.15–20 Conductors.
111.15–25 Overload and reverse current protection.

SUBPART 111.20—TRANSFORMERS

111.20–1 General requirements.
111.20–5 Temperature rise.

SUBPART 111.25—MOTORS

111.25–1 General requirements.
111.25–5 Nameplates.
111.25–10 Temperature limitations.
111.25–15 Duty cycle.
111.25–20 Dielectric strength of insulation.
111.25–25 Terminal arrangement.
111.25–30 Enclosure and protection.
111.25–35 Current ratings.

SUBPART 111.30—ELECTRIC COUPLINGS FOR PROPULSION

111.30–1 General requirements.

SUBPART 111.35—SWITCHBOARDS AND PROPULSION CONTROLS

111.35–1 General requirements.
111.35–5 Switchboard bus bars and wiring.
111.35–10 Switchboard mounted equipment.
111.35–15 Ship's service generator and distribution switchboards.
111.35–20 Emergency and interior communication switchboard.
111.35–25 Electric propulsion control.
111.35–30 Tests for switchboard and propulsion controls.

SUBPART 111.40—DISTRIBUTION PANELBOARDS (SWITCHBOARD AND PANELBOARD TYPES)

111.40–1 General requirements.

SUBPART 111.45—MOTOR CIRCUITS AND CONTROLLERS

Sec.
111.45–1 Motor controllers, general requirements.
111.45–5 Motor overcurrent protection.
111.45–10 Remote-control, electrical interlock, and indicator circuits.
111.45–15 Heater circuits.
111.45–20 Motor-branch-circuit overcurrent protection.
111.45–25 Motor feeder overcurrent protection.
111.45–30 Disconnecting means.
111.45–35 Special requirements for over 600 volts.
111.45–40 Group control panels.

SUBPART 111.50—DISTRIBUTION AND CIRCUIT LOADS

111.50–1 Distribution, general requirements.
111.50–5 Ship's service power circuits.
111.50–10 Lighting feeders.
111.50–15 Lighting branch circuits and lighting requirements.
111.50–20 Circuit loads and demand factors.

SUBPART 111.55—OVERCURRENT PROTECTION

111.55–1 Installation of overcurrent protective devices.
111.55–5 Location of overcurrent protective devices.
111.55–10 Enclosures of overcurrent protective devices.
111.55–15 Construction and use of overcurrent devices.
111.55–20 Interrupting rating of fuses and circuit breakers.
111.55–25 System protection.

SUBPART 111.60—WIRING METHODS AND MATERIALS

111.60–1 Electric cable.
111.60–5 Portable electric cord and fixture wire.
111.60–10 Wire and cable installation.
111.60–15 General requirements for wiring methods.
111.60–20 Outlet boxes.
111.60–25 Switches and circuit breakers.
111.60–30 Receptacle outlet and attachment plugs.
111.60–35 Lighting fixtures.
111.60–40 Wiring methods and material for hazardous location.

SUBPART 111.65—SPECIAL REQUIREMENTS FOR CERTAIN LOCATIONS AND SYSTEMS

111.65–1 Application.
111.65–5 Special requirements for hospital operating rooms.
111.65–10 Special requirements for locations where gasoline or other highly volatile motor fuel is carried in vehicles.
111.65–15 Special requirements for motion picture projection rooms and projection equipment.
111.65–20 Special requirements for electric elevators and dumbwaiters.
111.65–25 Special requirements for submersible motor-driven bilge pumps.
111.65–30 Special requirements for electric power-operated watertight door system.
111.65–35 Special requirements for fire screen door holding and release systems.
111.65–40 Special requirements of electric power-operated lifeboat winches.
111.65–45 Special requirements for electric air heaters.

SUBPART 111.90—ELECTRICAL EQUIPMENT AND INSTALLATIONS ON VESSELS CONTRACTED FOR PRIOR TO NOVEMBER 19, 1952

111.90–1 General.
111.90–5 Major alterations.
111.90–10 Vessels contracted for prior to July 1, 1937.
111.90–15 Vessels contracted for between July 2, 1937, and January 1, 1939.
111.90–20 Vessels contracted for between January 2, 1939, and June 1, 1941.
111.90–25 Vessels contracted for between June 2, 1941, and November 18, 1952.

AUTHORITY: §§ 111.01–1 to 111.90–25 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4426, 4427, 4433, 4453, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1384, 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 392, 399, 404, 405, 411, 435, 366, 395, 363, 369, 367, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 111.01—APPLICATION

§ 111.01–1 *General.* (a) The provisions of this part, with the exception of Subpart 111.90, shall apply to all vessels contracted for on or after November 19, 1952. The provisions of Subpart 111.90 shall apply to all vessels contracted for prior to November 19, 1952.

§ 111.01–5 *Should; meaning of.* (a) In order to have, wherever possible in this part, the identical wording contained in Section 35 of the American Bureau of Shipping Rules for the Classification and Construction of Steel Vessels, the word "should" has been used instead of "shall". Therefore, in each such instance where this word "should" is used in this part (except §§ 111.05–10 (c), 111.05–10 (d) and 111.05–10 (f)) to describe, or as applicable to, the equipment or installation, this word is to be considered the same as the word "shall" in describing Coast Guard requirements.

SUBPART 111.05—GENERAL REQUIREMENTS

§ 111.05–1 *Construction and installation.* (a) Electrical apparatus and wiring systems shall be in accordance with the requirements of this part. The requirements of this part are applicable to all vessels but may be modified by the Commandant for vessels certificated for limited service or for vessels less than 300 gross tons. The requirements of this part are minimum requirements and it is recommended that details not covered by the regulations be in general conformity with Standard No. 45 of the American Institute of Electrical Engineers.

§ 111.05–5 *Plan approval*—(a) *General.* (1) The required plans listed in this subpart are general in character, but include all plans which normally show construction and safety features coming under the cognizance of the Coast Guard. In the case of a particular vessel, all of the plans enumerated may not be applicable, and it is intended that only those plans and specifications be submitted as will clearly show the vessel's arrangement, construction and required equipment.

(2) In the list of required plans given in this section, those indicated by an asterisk cover the electrical items necessary for the approval of the installation by the American Bureau of Shipping for vessels classed by that organization. When prints bearing record of such approval by the American Bureau of Shipping are forwarded to the Coast Guard, they will, in general, be accepted as satisfactory except insofar as the law or the regulations in this chapter contain requirements which are not covered by the American Bureau of Shipping.

(b) *Procedure for submittal of plans.* (1) As the relative location of shipyards, design offices, and Coast Guard officers vary throughout the country, no specific routing will be required in the submittal of plans. In general, one of the procedures outlined in this paragraph would apply, but in a particular case, if a more expeditious procedure can be used, there will be no objection to its adoption.

(2) The plans may be submitted to the Officer in Charge, Marine Inspection, at or nearest the place where the vessel is to be built. This procedure wil be most expeditious in the case of those offices where personnel and facilities are available for examination and approval of the plans locally.

(3) The plans may be submitted directly to the Commandant (MMT), U. S. Coast Guard, 1300 E Street, NW., Washington 25, D. C. In this case, the plans will be returned directly to the submitter, with a copy of the action being forwarded to the interested Officer in Charge, Marine Inspection.

(4) in the case of classed vessels, upon specific request by the submitter, the American Bureau of Shipping will arrange to forward the necessary plans to the Coast Guard indicating their action thereon. In this case, the plans will be returned as noted in subparagraph (3) of this paragraph.

(c) *Number of plans required.* (1) Three copies of each plan are normally required so that one can be returned to the submitter and one copy each can be retained by Coast Guard Headquarters and the Officer in Charge, Marine Inspection. If the submitter desires additional approved plans, a suitable number should be submitted to permit the desired distribution.

(d) *Electrical plans required for new construction.*[1] (1) Specifications.

(2) * General Arrangements.

(3) * Switchboard front, rear, end, and section views.

(4) * Switchboard wiring diagram.

(5) * Switchboard material and nameplate list.

(6) Elementary wiring diagram of metering and automatic switchgear.

(7) * Description of operation of propulsion control and bus transfer switchgear.

(8) * Elementary wiring diagram of power system (supplemented by cable lists, panelboard summaries, etc., if desired) giving:

(i) * Type and size of generator;

(ii) * Type and size of generator cables, bus-tie cables, feeders, and branch circuit cables;

(iii) Power, lighting, and interior communication panelboards showing

[1] The items marked with an asterisk (*) indicate such items may require the approval of the American Bureau of Shipping.

number of circuits and rating of energy consuming devices;

(iv) Type and capacity of storage batteries;

(v)* Rating of circuit breakers and switches, interrupting capacity of circuit breakers, and rating or setting of overcurrent devices.

(9)* Electric plant summary showing connected loads and calculated operating loads for various conditions of operation.

(10)* Isometric or deck wiring plans of power system, including symbol list.

(11) Elementary wiring diagram of steering gear alarm circuits and ventilation shut-down control.

(12) Elementary wiring diagram and isometric or deck wiring diagrams of electric watertight door system, fire screen door holding system, and power operated lifeboat winches.

(13)* Auxiliary and propulsion motors and generators. Manufacturer's outline drawing of each giving nameplate data, degree of enclosure, type of insulation, temperature rise above stated ambient temperature, duty cycle, and application or name of auxiliary driven.

(14)* Motor starters. Manufacturer's enclosure outline drawing, control elementary wiring diagram, and application of each. For lifeboat winch motor starters, see § 111.65–40.

(15) Distribution panelboards, branch boxes, enclosed switches, pushbutton stations, control switches, etc. Manufacturer's outline drawing or suitable identification on deck wiring plan symbol list. For lifeboat winch control switches, see § 111.65–40.

(16) Isometric or deck wiring plan of lighting feeders.

(17)* Deck plans of lighting system showing location of cables, fixtures, and wiring devices, cable sizes and types, and manufacturer's name and identification of fixtures and wiring devices. If manufacturer's name and identification are contained in a symbol list, the corresponding symbol marking should be employed on the deck plans.

(18) Elementary and isometric or deck wiring diagrams of engine order telegraph system, sound powered telephone system, general alarm system, emergency loudspeaker system, rudder angle indicator system, shaft speed indicator system, gyro compass system, gyro pilot system, radio system, radar plan position indicator system, loran system, refrigerated spaces alarm system, etc., with material identified by name of manufacturer and drawing and/or catalog number. If manufacturer's name and identification are contained in a symbol list, the corresponding symbol marking should be employed on the deck plans.

(19) Elementary and deck wiring plans of fire detecting and alarm system, manual alarm system, smoke detecting system, carbon dioxide extinguishing system alarms, and supervised patrol system, with material identified by name of manufacturer and drawing and/or catalog number. If manufacturer's name and identification are contained in a symbol list, the corresponding symbol marking should be employed on the deck plans.

(e) *Electrical plans required for repairs and alterations of existing vessels.* (1) No repairs or alterations affecting the safety of the vessel shall be made without the knowledge of the Officer in Charge, Marine Inspection.

(2) Drawings of alterations shall be approved before work is started unless deemed unnecessary by the Officer in Charge, Marine Inspection. The general scope of the plans shall be as noted in paragraph (d) of this section. Drawings will not be required for repairs in kind.

§ 111.05–10 *Testing and inspection*—(a) *Application.* This section shall be applicable to all vessels, both those existing as of November 18, 1952, and those contracted for on and after November 19, 1952.

(b) *General.* (1) The general requirements for inspection of vessels are contained in Part 71 of Subchapter H (Passenger Vessels) and Part 91 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter. The contents of this section supplement the general requirements contained in other parts of this chapter.

(2) In the inspection of electrical equipment and installations, the rules promulgated by the American Bureau of Shipping respecting materials and construction, and the certificate of classification referring thereto, except when otherwise provided for by the rules and regulations of this subchapter, shall be accepted as standard.

(i) The requirements of this paragraph shall not be construed to imply that ship tests or factory inspections of electrical apparatus or equipment of the types regularly conducted by the American Bureau of Shipping will be conducted by the Coast Guard. Shop tests of electrical apparatus or equipment will be conducted by the Coast Guard only when specifically required by the regulations in this chapter, or when specifically requested, either by the manufacturer, shipbuilder, owner, or the Coast Guard, and agreed to by all concerned.

(c) *Initial inspection*—(1) *Scope.* The initial inspection, which may consist of a series of inspections during the construction of the vessel, shall include a complete inspection of the electrical installation and electrical equipment or apparatus. The inspection shall be such as to insure that the arrangement, materials, and installations thereof, fully comply with the applicable regulations in this chapter and are in accordance with approved plans. The inspection shall also be such as to insure that the workmanship of all equipment and apparatus and the installation thereof is, in all respects, satisfactory.

(2) *Inspections required.* The specific inspections described in this paragraph are intended as suggestions to the marine inspector. It is not the intention of this paragraph to require, in the case of any particular vessel, any tests which, in the opinion of the Officer in Charge, Marine Inspection, are unnecessary.

(3) *Electric cable.* Electric cable should be checked during installation for size and type as shown on the approved plans. The adequacy of cable supports should be checked, and it should be ascertained that no cable is installed in the proximity of steam pipes or other hot objects and that no damage has been incurred to the cables during the installation due to excessive pulling force having been applied, or due to sharp bends or sharp or rough edges of cable supports or bulkhead penetrations, etc. Cable penetrations required to be watertight should be checked for proper packing of the terminal or stuffing tubes, including provisions for future take-up of gland nuts.

(4) *Generators.* Generators should be checked for general condition, both electrical and mechanical, voltage regulation, parallel operation, operation of safety devices such as reverse current or reverse power trips, overcurrent trips, overspeed trips, low oil pressure trips, etc.

(5) *Rotating electrical machinery.* Rotating electrical machinery should be checked to assure that rotating and/or uninsulated electrical parts are adequately shielded from accidental contact by personnel.

(6) *Switchboards.* Switchboards should be checked for hand rails, guard rails, working spaces, insulating floor covering, drip covers, and enclosures for backs and ends. Switchboard mounted apparatus should be checked for identifying nameplates. Circuit nameplates should be compared with the rating or setting of the overcurrent devices and with the approved plans. The accessibility of items requiring maintenance or adjustment should be checked. Meters should be checked for proper calibration. The operation of automatic switchgear and mechanical interlocks should be observed.

(7) *Motor starters.* Motor starters should be checked to assure proper starting of the motor under service conditions. A wiring diagram of each motor starter should be secured to the inside of its enclosure door. Each motor starter not completely disconnected from all sources of potential when the disconnect switch is opened (due to electrical interlocked circuits necessary for proper operation of the apparatus or for other valid reasons) should be checked to assure that attention is directed to such conditions by a suitable sign.

(8) *Disconnect switches.* The presence and location of disconnect switches required for motor starters, fuses, etc., should be checked. When a switch or circuit breaker on a switchboard or distribution panel is intended to serve as a motor and controller disconnect switch, it shall be determined that the applicable requirements of the regulations in this subchapter have been met.

(9) *Accessibility.* The accessibility of electrical apparatus for normal inspection and maintenance should be observed. The accessibility of junction boxes and the like in way of paneling should be noted during construction of a vessel. Hinged doors of motor starters and similar apparatus should be checked for interference with adjacent structural parts or apparatus.

(10) *Panelboards.* The rating or setting of the overcurrent devices should

be compared with the values given on the circuit directory and with the approved plans. The accuracy of the directory description of loads served by each circuit should be checked.

(11) *Grounding.* It should be determined that metal enclosures for electrical equipment are grounded, either by the method of mounting or ground leads. Portable equipment should be checked for grounding through the grounding conductor of the supply cable.

(12) *Emergency lighting and exit lights.* The adequacy of emergency lights and exit lights should be checked at night with all general lighting turned off.

(13) *General alarm system.* The general alarm system should be checked with a sound level meter, the sound level of the bells being measured in each stateroom for passengers or crew with doors closed. Where the background noise level is questionable, the background noise level should be measured while the vessel is underway.

(14) *Emergency loudspeaker system.* The emergency loudspeaker system should be checked with a sound level meter, the sound level being measured at several locations in the vicinity of each lifeboat handling station, each lifeboat embarkation station, each passenger assembly station, and throughout crew quarters. Where the background noise level is questionable, the background noise level should be measured while the vessel is underway. It should be demonstrated that voice reproduction is of good quality and intelligibility is of a high order. It should be demonstrated that grounding either conductor or "shorting" both conductors to any lifeboat station loudspeaker or to an embarkation deck loudspeaker will not reduce the output of any one of the remaining loudspeakers by more than 3 decibles.

(15) *Fire detecting systems.* Fire detecting systems should be checked for compliance with the applicable regulations in this chapter and for conformance with the approved plans. Power supply circuits and thermostat circuits should be checked for supervision.

(16) *Communication systems.* All communication systems should be checked for performance and for compliance with the regulations in this chapter.

(17) *Insulation resistance.* All electric power and lighting cable and equipment should be checked for proper insulation resistance to ground and between conductors.

(d) *Annual inspection.* (1) *General.* The annual inspection of electrical installations shall include an inspection of all items enumerated under paragraph (c) of this section to the extent necessary to determine mechanical and electrical condition and performance. Particular note should be made of circuits added or modified after the initial inspection.

(2) *Fire detecting system.* Fire detecting thermostats should be tested at regular intervals (at least 25 percent of those installed tested annually) to detect any change in operating characteristics. A portable hand light with an open end sheet metal shield (such as a No. 3 fruit can) replacing the usual guard and globe would usually serve as a source of heat to operate the thermostat without damage to paint work or to the thermostat itself. Any thermostat requiring a time to operate materially different from the average when covered with the heating device should be suspected of being defective and forwarded to Coast Guard Headquarters for further testing.

(3) *Vital machinery.* Motors, motor starters and control switches used with machinery vital to the safety or propulsion of the vessel should be examined visually and opened for closer inspection when there is evidence of deterioration.

(4) *Storage batteries.* Storage batteries used for emergency lighting, diesel-engine-driven emergency generator starting, general alarm, etc., should be checked for capacity. Storage batteries supplying emergency lighting should be required to carry the connected loads for the prescribed length of time.

(e) *Special survey of unclassed passenger vessels.* (1) Special surveys, applicable to the age of the vessel and corresponding to class surveys, shall be conducted by marine inspectors on all unclassed passenger vessels. These surveys shall in no way affect the thoroughness of annual inspections.

(2) The frequency of special surveys shall be as required by Part 71 of Subchapter H (Passenger Vessels) of this chapter.

(3) Fittings and connections on switchboards and distribution panels shall be examined. It shall be assured that all circuits are protected properly against overcurrent.

(4) Cables shall be examined as far as practicable without undue disturbance of cable and apparatus.

(5) All generators shall be run under load, either separately or in parallel; switches and circuit breakers shall be tested.

(6) All equipment and circuits shall be inspected for possible development of physical changes or deterioration. The insulation resistance of the circuits shall be measured between conductors and between conductor and ground and these values compared with those previously measured. Any large and abrupt decrease in insulation resistance shall be further investigated and either restored to normal or renewed as indicated by the condition found.

(7) (i) Where electrical auxiliaries are used for vital purposes, the generators and motors shall be examined and their prime movers opened for inspection. The insulation resistance of each generator and motor shall be measured with all circuits of different voltages above ground being tested separately. This test shall be made at a direct-current potential of 500 volts, if practicable, and the insulation resistance in megohms shall be at least equal to:

$$\frac{\text{Rated voltage of the machine}}{\frac{\text{Rating in KVA}}{100}+1{,}000} \quad (1)$$

(ii) The minimum insulation resistance of the fields of machines separately excited with voltage less than the rated voltage of the machine be of the order of one-half to one megohm.

(8) The windings of propulsion generators and motors shall be thoroughly examined and found or made dry and clean. Particular attention shall be paid to the ends of all windings of stators and rotors. After the windings have been cleaned and dried, they shall be varnished, if necessary, with insulating varnish applied preferably by spraying.

(9) All air ducts in stator coils and the ventilating holes in rotors and retaining rings of propulsion alternators shall be carefully examined and found or made clear and clean.

(10) All propulsion cable runs shall be examined and found or placed in good condition as to supports, etc., and the ground connections of protective coverings or sheaths found or made substantial and effective. Particular attention shall also be paid to high potential bus insulators which shall be free from dust or oil in order to prevent creepage to ground.

(11) The insulation resistance of each propulsion unit shall be measured and found or made equal to the requirements given in subparagraph (7) of this paragraph for auxiliary generators and motors. In order to further evaluate these insulation resistance readings, it is recommended that a separate log be kept of insulation resistance measurements taken frequently at regularly scheduled intervals. Humidity, ambient temperature, and condition of the machine shall also be noted. Any large or abrupt decrease in insulation resistance when compared with those recorded in the log shall be further investigated and either restored to normal or renewed as indicated by the conditions found.

(i) Where a log is not available for the comparison of measured insulation resistance values with those previously taken at regularly scheduled intervals, the cables and windings, except direct-current fields of propulsion generators and motors, shall be subjected to a dielectric strain test for one minute by the application of a potential of 125 percent of the maximum operating voltage of the circuits to which they are applied. The direct-current fields of generators and motors shall be subjected for one minute to a test potential equal to 50 percent of the value specified by §§ 111.10–35 and 111.25–20.

(f) *Repairs or alterations.* An inspection, either general or partial, depending upon the circumstances, shall be made whenever any important repairs or alterations are undertaken.

§ 111.05–15 *General considerations.*—(a) *General.* (1) Electrical installations on vessels shall be such that (i) services essential for safety will be maintained under various emergency conditions; and (ii) the safety of passengers, crew, and vessel from electrical hazards will be assured.

(2) Electrical equipment should be so placed or protected as to minimize the possibility of mechanical injury or damage from the accumulation of dust, oil vapors, steam, or dripping liquids. Apparatus liable to arc should be ventilated or placed in ventilated compartments in which flammable gases, acid fumes, and oil vapors cannot accumulate. Skylights

and ventilators are to be so arranged as to avoid the possibility of flooding the apparatus.

(b) *Protection from bilge water.* All generators, motors, and electric couplings are to be so arranged that they cannot be damaged by bilge water, and if necessary a watertight coaming should be provided to form a well around the base of such equipment with provisions for pumping out the well.

(c) *Accessibility.* The design and arrangement of electrical apparatus should provide accessibility to parts requiring inspection or adjustment. Armature and field coils, rotors and revolving fields should be removable, and where air ducts are used there should be means of access.

(d) *Watertight equipment.* All electrical equipment exposed to the weather or located in spaces where they would be exposed to seas, splashing, or other severe moisture condition, shall be of the watertight type or be protected by means of watertight enclosures.

(e) *Corrosion-resistant parts.* Enclosures, working and other parts of electrical equipment which would be damaged or rendered ineffective by corrosion shall be made of corrosion-resistant materials or of material rendered adequately corrosion resistant.

(f) *Grounding permanent equipment.* In general the frames or cases of all permanently installed generators, motors, controllers, power and lighting transformers, instruments, and similar equipment, for which the arrangement and method of installation does not assure positive grounding, shall be permanently grounded through separate conductors and protected against damage.

§ 111.05–20 *Temperature ratings.* (a) In the requirements contained in this subchapter an ambient temperature of 40 degrees C. has been assumed for all locations except boiler and engine rooms while for these spaces 50 degrees C. has been assumed as the ambient temperature. Where the ambient temperature is in excess of these values, the total temperature specified shall not be exceeded. Where equipment has been rated on ambient temperatures less than those contemplated, consideration will be given to the use of such equipment provided the total temperature for which the equipment is rated will not be exceeded.

§ 111.05–25 *Nature of electrical supply*—(a) *Standard systems.* The following systems of distribution are recognized as standard:

(1) Two-wire with direct current or single phase alternating current;

(2) Three-wire with direct current or single phase alternating current; and,

(3) Three-wire, three-phase alternating current.

(b) *Standard voltages.* The voltages given in Table 111.05–25 (b) are recognized as standard.

TABLE 111.05–25 (b)—STANDARD VOLTAGES

Equipment	Direct current (volts)	Alternating current (volts)
Lighting	115	115.
Power	115 and 230	115, 220, and 440.
Generators	120 and 240	120, 230, and 450.
Propulsion	1,000 maximum.	7,500 maximum.

(c) *Standard frequency.* A frequency of 60 cycles per second is recognized as standard for alternating-current lighting and power systems.

(d) *Others.* Special consideration will be given to systems, voltages, or frequencies differing from the recognized standard.

§ 111.05–30 *Insulation materials.* (a) Insulation material referred to in this subchapter is designated by class as covered in this section.

(b) Class "A" Insulation refers to enameled wire, molded and laminated materials with cellulose filler, phenolic resins and other resins of similar properties, films and sheets of cellulose acetate and other cellulose derivatives of similar properties or to cotton, silk, paper and similar materials when so treated or impregnated as to increase the thermal limit or when permanently immersed in liquid dielectric.

(c) Class "B" Insulation refers to mica, asbestos, fiberglass and other materials capable of resisting high temperatures. Class "A" material or binder may be used in Class "B" insulation provided it be used for structural purposes only and may be destroyed without impairing the insulating or mechanical qualities of the insulation.

(d) Class "C" Insulation refers to materials capable of resisting higher temperatures than those of Class "B", such as pure mica, porcelain, quartz, or similar material.

(e) Class "O" Insulation refers to cotton, silk, paper and similar organic materials when neither impregnated nor immersed in liquid dielectric.

(f) Class "H" Insulation refers to materials of:

(1) Mica, asbestos, fiberglass and similar organic materials in built-up form with binding substances composed of silicone compounds, or materials with equivalent properties; or,

(2) Silicone compounds in rubbery or resinous forms, or materials with equivalent properties.

(3) A minute proportion of Class A materials may be had only where essential for structural purposes during manufacture.

NOTE: The electrical and mechanical properties of the insulated winding must not be impaired by the application of temperatures permitted for Class H material. The word "impaired" is here used in the sense of causing any change which would disqualify the insulating material for continuous service.

SUBPART 111.10—GENERATORS

§ 111.10–1 *Power requirements*—(a) *Propulsion.* The power from the main propulsion equipment may be derived from a single generator.

(b) *Ship's service.* All ocean vessels using electricity for ship's service power or light shall be provided with at least two ship's service generators. The aggregate capacity of the generators shall be sufficient to carry the necessary sea load under normal operation with any one generator in reserve.

(c) *Emergency power and lighting.* See Part 112 of this subchapter for requirements.

§ 111.10–5 *Prime movers.* (a) In general, compliance of prime movers with the rules promulgated by the American Bureau of Shipping will be considered as satisfactory evidence of structural and operational efficiency of prime movers.

(b) Special consideration will be given to the structural and operational features of prime movers for small vessels or of unusual design not contemplated by the rules of the American Bureau of Shipping.

§ 111.10–10 *Excitation*—(a) *General.* Exciters should conform to all the applicable requirements for d. c. generators.

(b) *Propulsion.* Separately excited propulsion generators should be provided with more than one means of excitation. Exciters may be either direct connected or independent generating sets. Current may be derived from the ship's service power or lighting sets.

§ 111.10–15 *Generator construction*—(a) *General.* (1) In general, compliance of generators with the rules promulgated by the American Bureau of Shipping will be considered as satisfactory evidence of the structural efficiency of generators.

(2) Special consideration will be given to the construction of generators for small vessels or of unusual design not contemplated by the rules of the American Bureau of Shipping.

(b) *Circulating currents.* Means shall be provided to prevent circulating currents from passing between the journal and the bearing, where the design and arrangement of the machine is such that damaging current may be expected.

(c) *Moisture condensation prevention.* When the weight of the generator excluding the shaft is over 1,000 pounds, it should be provided with means to prevent moisture condensation in the machine when idle. Where steam heating coils are installed for this purpose, there are to be no pipe joints inside the casings.

(d) *Terminal arrangement.* All generator terminals shall be protected against accidental contact and mechanical damage, and shall be provided with drip-proof enclosures, except that for bottom location of terminals, drip-proof enclosures need not be provided. Where cables enter the enclosures from the side or the top, they shall be provided with stuffing or terminal tubes.

(e) *Nameplates.* (1) All generators shall be fitted with nameplates of corrosion-resistant material marked with the following information:

(i) Manufacturer's type and frame designations;

(ii) Output;

(iii) Kind of rating;

(iv) Temperature rise at rated load;

(v) Design ambient temperature;

(vi) Revolutions per minute at rated load;

(vii) Voltage;

(viii) Amperes at rated load; and,

(ix) Type of windings for d. c. machines.

(2) For a. c. generators, in addition to the applicable parts listed in subpara-

graph (1) of this paragraph, the following information shall be set forth:

(i) Number of phases;

(ii) Frequency;

(iii) Power factor;

(iv) Exciter voltage; and,

(v) Exciting current in amperes at rating.

(f) *Temperature detectors.* Alternating-current generators of 500 kva and above, when access to coils is difficult, and all alternating-current propulsion generators, should be provided with means for obtaining the temperatures of the stationary windings. The temperature should be indicated at a convenient location, preferably the control panel.

(g) *Ventilation and protection.* (1) Propulsion and ship's service generators not enclosed ventilated shall have all openings protected with substantial wire or mesh screen to prevent personnel injury, and shall be provided with protection against dripping liquids equivalent to that of a drip-proof machine.

(2) Where the protection of the generator is not the equivalent of a protected machine as defined in § 110.15–175 (h) of this subchapter, the arrangement will require specific approval for each installation.

(3) Dampers shall be provided in ventilation air ducts except where recirculating systems are used.

(h) *Fire extinguishing.* Fire extinguishing systems suitable for fires in electrical equipment are to be fitted to propulsion generators which are enclosed or in which the air gap is not directly exposed. See Part 76 of Subchapter H (Passenger Vessels) and Part 95 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter for details of the systems.

(i) *Insulation of windings.* Armature and field coils should be treated to resist oil and water.

(j) *Lubrication.* (1) In general, all generators should be located with their shafts in a fore and aft direction on the vessel and they must lubricate and operate satisfactorily when permanently inclined to an angle of 15 degrees athwartship and 5 degrees fore and aft; the bearings are to be so arranged that they will not spill oil under a momentary roll of 30 degrees. Where it is not practicable to mount the generators with armature shafts in the fore and aft direction, their lubrication will require special consideration. Generators depending on forced lubrication are to be so arranged to shut down automatically on loss of oil pressure. Provision is to be made to prevent oil or oil vapor from passing into the machine windings.

(2) For lubrication of emergency diesel-driven generator sets also see Subpart 112.50 of this subchapter.

§ 111.10–20 *Voltage regulation*—(a) *Ship's service generator.* (1) Ships service generator's inherent voltage regulation characteristics shall comply in general with all the applicable requirements contained in Table 111.10–20 (a) (1):

Table 111.10–20 (a) (1)

Type of generator	Load variation	Voltage variation (maximum)
D. c. shunt or stabilized shunt wound generator	100 percent to 20 percent (decreasing). 20 percent to 100 percent (increasing).	8 percent voltage rise. 12 percent voltage drop.
D. c. compound wound generator and d. c. shunt wound generator with voltage regulator.	20 percent to 100 percent (increasing).	2½ percent.
	20 percent to 100 percent (increasing). 100 percent to 20 percent (decreasing).	3 percent from average of ascending and descending curves.
D. c. 3-wire generator (in addition to the above).	Rated current on either positive or negative and 25 percent rated current on neutral and rated voltage positive to negative.	Negative to neutral and positive to neutral 2 percent of rated positive to negative voltage.
A. c. generator and regulator (no reactive droop compensation).	0 percent to 100 percent (increasing). 100 percent to 0 percent (decreasing). (At rated power factor.)	1 percent of rated voltage from a median value halfway between highest and lowest values attained.[1]
Two or more a.-c. generators and regulators with reactive droop compensation adjusted for a voltage droop of not more than 4 percent of rated voltage for a reactive load change from 0 percent to 60 percent of continuous kilovolt-ampere rating.	0 percent to 100 percent (increasing). 100 percent to 0 percent (decreasing). (At rated power factor.)	Not more than 4 percent droop and no point more than 1 percent of rated voltage from the average curve drawn through a plot of settled voltage versus load for any increasing or decreasing load between zero and full load.

[1] May be 2½ percent for emergency generator.

(2) Generators shall, where practicable, be tested with their own driving units. When tested with temporary driving units, allowance shall be made for the expected speed regulation of the driving units to assure satisfactory voltage regulation, as given in Table 111.10–20 (a) (1) after assembly with the permanent driving units.

(b) *D. C. generators.* Where automatic voltage regulators are not supplied the d. c. ship's service generators should be approximately flat compounded except that, if the load fluctuation does not interfere with the operation of vital auxiliaries, shunt wound generators without voltage regulators or stabilized shunt wound machines may be used.

(c) *A. C. generators.* In general a separate regulator should be supplied for each a. c. generator. When it is intended that 2 or more generators will be operated in parallel, reactive droop compensating means should be provided to divide the reactive power properly between the generators. The regulator in conjunction with the exciter and the generator characteristics should be capable of performing in accordance with conditions set forth in (a) of this section.

§ 111.10–25 *Parallel operation.* (a) In general, when the installation is such that 2 or more generators are to be operated in parallel, the load on any generator should not differ more than plus or minus 15 percent of its rated kilowatt load from its proportionate share, based on the generator ratings, of the combined load for any steady state condition in the combined load between 20 percent and 100 percent of the sum of the rated loads of all generators. The starting point for the determination of the foregoing load distribution requirements should be at 75 percent load with each generator carrying its proportionate share.

§ 111.10–30 *Temperature limitations.* (a) Generators shall be designed for an ambient temperature of 50 degrees C. When tested in accordance with American Standard C50, the temperature rises shall not exceed the values given in Tables 111.10–30 (a1) and 111.10–30 (a2). Where provisions are made for insuring an ambient temperature of 40 degrees C. or less, the temperature rises may be 10 degrees C. higher than the values given in the tables.

Table 111.10–30 (a1)—Limits of Temperature Rises for D. C. Generators

Part of generator	Limits of temperature rises—degrees centigrade (measured by thermometer)			
	Class A insulation		Class B insulation	
	50° C. ambient		50° C. ambient	
	Continuous	At end of 2-hour overload	Continuous	At end of 2-hour overload
All insulated windings other than items next following	50	55	60	75
Single-layer field windings with exposed uninsulated surfaces and bare copper windings	50	65	70	85
Cores and mechanical parts in contact with or adjacent to insulation	40	55	60	75
Commutator and collector rings	55	65	70	85
German silver or grid shunts on series field windings	175		175	
Bearings	38		40	

TABLE 111.10-30 (a2)—LIMITS OF TEMPERATURE FOR A. C. GENERATORS BASED ON 50° C. AMBIENT TEMPERATURE

Item	Limits of temperature rises, degrees centigrade				
	Determined by—	Salient pole generators		Turbine type generators	
		Class A insulation	Class B insulation	Class A insulation	Class B insulation
Armature windings of machines of 1,500 kva. and less.	Thermometer	40	60		
Armature windings of machines of 750 kva. and less.	do			40	60
Armature windings with 2 coil sides per slot in stators of machines above 1,500 kva.	Imbedded detector	50	70		
Armature windings with 2 coil sides per slot in stators of machines above 750 kva.	do			50	70
Insulated field windings	Resistance	50	70		80
Collector rings	Thermometer	55	75	55	75
Cores and mechanical parts in contact with or adjacent to insulation.	do	40	60	40	60
Bearings	do	35	40	35	40

§ 111.10-35 *Dielectric strength of insulation.* Generators shall be capable of withstanding without damage a dielectric test in accordance with American Standard C50.

§ 111.10-40 *Tests.* (a) Sufficient tests should be made by the manufacturer to insure that the machine is in accordance with these regulations.

SUBPART 111.15—STORAGE BATTERIES

§ 111.15-1 *General requirements—*(a) *Power and light batteries.* Power and light batteries may be of the acid or alkaline type and the cells should be so constructed as to prevent spilling of the electrolyte through the motion of the ship. Batteries should be so arranged that the trays are accessible and with not less than 10 inches head room.

(b) *Emergency storage batteries.* When batteries are used for emergency lighting and power loads, the requirements of Part 112 of this subchapter are also applicable.

§ 111.15-5 *Battery installation and arrangement—*(a) *Large storage batteries.* Large storage batteries such as those for emergency lighting should be installed in a room assigned to the battery only but may be installed in a deck box if such a room is not available. No appliances subject to sparking should be installed in a battery room unless of the explosion proof type. The overload protective device required by § 111.15-25 should be placed in each conductor adjacent to but outside the room.

(b) *Batteries of moderate size.* Batteries of moderate size (20 to 36 volts) such as those for engine cranking or communications supply may be installed in the battery room or may be installed in battery lockers in the emergency generator room, machinery space or other suitable location. Cranking batteries should be located as closely as possible to the engine or engines served.

(c) *Battery trays.* Battery trays should be chocked with wood strips or equivalent to prevent movement and each tray should be fitted with nonabsorbent insulating supports on the bottom and with similar spacer blocks at the sides or with equivalent provisions to secure air circulation space all around each tray.

§ 111.15-10 *Ventilation—*(a) *Battery rooms.* Battery rooms should be ventilated to avoid accumulation of flammable gas. Natural ventilation may be employed if ducts can be run directly from the top of the battery room to the open air above. If natural ventilation is impracticable, mechanical exhaust ventilation should be provided with fan intake at the top of the room. Fans should be capable of completely changing the air in the battery room in not more than 2 minutes. Openings for air inlet should be provided near the floor.

(b) *Battery lockers.* Battery lockers should be ventilated, if practicable, similarly to battery rooms by a duct led from the top of the locker to the open air or to an exhaust ventilation duct, but the duct may terminate not less than 3 feet above the top of the locker in machinery spaces and similar well ventilated compartments. Louvres or equivalent should be provided near the bottom for entrance of air.

(c) *Deck boxes.* Deck boxes should be provided with a duct from the top of the box terminating at least 4 feet above in a goose neck, mushroom head or equivalent to prevent entrance of water. Holes for air inlet should be provided on at least 2 opposite sides of the box. The entire deck box, including openings for ventilation, should be weathertight to prevent entrance of spray or rain.

(d) *Boxes for small batteries.* Boxes for small batteries require no ventilation other than openings near the top to permit escape of gas.

§ 111.15-15 *Protection from corrosion.* The interiors of all battery rooms, including the structural parts and shelves therein as well as ventilation inlets and outlets, should be painted with corrosion-resistant paint. Shelves in battery rooms or lockers for acid batteries should have a watertight lining of sheet lead of 1/16-inch thick carried up not less than 3 inches on all sides. For alkaline batteries the shelves should be similarly lined with steel not less than 1/32-inch thick. Alternatively, a battery room may be fitted with a watertight lead pan, steel for alkaline batteries, over the entire deck, carried up not less than 6 inches on all sides. Deck boxes should be lined in accordance with the above alternative method. Boxes for small batteries should be lined to a depth of 3 inches consistent with the methods described above.

§ 111.15-20 *Conductors.* When conductors enter battery rooms the holes shall be made watertight. All connections within battery rooms shall be resistant to the electrolyte. Cables shall be sealed to resist the entrance of electrolyte by spray or creepage. The size of the connecting cable is to be based on current carrying capacities given in Table 111.60-1 (e) (1) (i) and the starting rate of charge or maximum discharge rate, whichever is the greater, shall be taken into consideration in determining the cable size.

§ 111.15-25 *Overload and reverse current protection.* An overload protective device is to be placed in each battery conductor. (For location with regard to battery rooms see § 111.15-5 (a).) The charging equipment for all batteries with a voltage more than 20 percent of the line voltage should provide automatic protection against reversal of current.

SUBPART 111.20—TRANSFORMERS

§ 111.20-1 *General requirements.* (a) All transformer windings should be treated to resist moisture, sea atmosphere, and oil vapors.

§ 111.20-5 *Temperature rise.* (a) The temperature rises, based on an ambient temperature of 40 degrees C., should not exceed the following:

Class A insulation	Class B insulation
55° C.	80° C.

(b) If the ambient temperature exceeds 40 degrees C. the transformer should be derated so that the total temperature given in this section is not exceeded. Temperatures are to be taken by the resistance or thermometer method of temperature determination.

SUBPART 111.25—MOTORS

§ 111.25-1 *General requirements.* (a) The requirements for generators contained in § 111.10-15 (a), (b), (c), (f), (g), (h), (i) and (j) are also applicable to motors, except that § 111.10-15 (c), (f) and (h) are applicable to propulsion motors only.

§ 111.25-5 *Nameplates.* (a) All motors shall be fitted with nameplates of corrosion-resistant material. The nameplates shall be marked with the following information:

(1) Manufacturer's type and frame designation;
(2) Output (hp.);
(3) Kind of rating;
(4) Design ambient temperature;
(5) Temperature rise at rated load;
(6) Revolutions per minute at rated load;
(7) Voltage;
(8) Amperes at rated load; and,
(9) Type of winding (for d. c. machines).

(b) For a. c. motors, in addition to the applicable parts listed in paragraph (a) of this section, the nameplates shall be marked with the following:

(1) Number of phase;
(2) Frequency;
(3) Power factor;
(4) Exciter voltage;
(5) Exciting current in amperes at rating; and,

(6) For motors rated at ½ horsepower or larger, except a polyphase wound-rotor motor, a code letter to show its input in kilovolt-amperes with locked rotor selected from the table given in section 94304, Chapter 9, National Electrical Code.

§ 111.25–10 *Temperature limitations.* (a) Motors for use in the engine room or boiler room shall be designed for an ambient temperature of 50 degrees C. Motors for use in locations where the ambient temperature will not exceed 40 degrees C may be designed for an ambient temperature of 40 degrees C. Motors, when tested in accordance with American Standard C50, shall not exceed the limits of temperature rises given in Tables 111.25–10 (a1) and (a2).

TABLE 111.25–10 (a1)—LIMITS OF TEMPERATURE RISES FOR D. C. MOTORS

Part of motor and type of enclosure	Limits of temperature rises; degrees centigrade			
	Class A insulation		Class B insulation	
	40° C. ambient temperature	50° C. ambient temperature	40° C. ambient temperature	50° C. ambient temperature
All insulated windings other than item next following:				
Open and semienclosed	50	40	70	60
Totally enclosed	55	45	75	65
Single-layer field windings with exposed uninsulated surfaces and bare copper windings:				
Open and semienclosed	60	50	80	70
Totally enclosed	65	55	85	75
Cores and mechanical parts in contact with or adjacent to insulation:				
Open and semienclosed	50	40	70	60
Totally enclosed	55	45	75	65
Commutators and collector rings: All types	65	55	85	75
Bearings:				
Open and semienclosed	40	35	45	40
Totally enclosed	45	40	50	45

TABLE 111.25–10 (a2)—LIMITS OF TEMPERATURE RISES FOR A. C. MOTORS[1]

Part of motor and type of enclosure	Limits of temperature rises; degrees centigrade			
	Class A insulation		Class B insulation	
	40° C. ambient temperature	50° C. ambient temperature	40° C. ambient temperature	50° C. ambient temperature
Coil windings, cores and mechanical parts in contact with, or adjacent to insulation:				
All except totally enclosed	50	40	70	60
Totally enclosed	55	45	75	65
Collector rings, commutators (the class of insulation refers to insulation affected by the heat from the commutator or collector rings, which insulation is employed in the construction of the commutator or collector rings or is adjacent thereto): All types	65	55	85	75
Bearings:				
Open and semienclosed	40	35	45	40
Totally enclosed	45	40	50	45

[1] Squirrel-cage windings and mechanical parts not in contact with or adjacent to insulation may reach such temperatures as will not be injurious in any respect.

§ 111.25–15 *Duty cycle.* (a) Motors shall be rated for continuous duty, except that motors for the applications listed in Table 111.25–15 (a) may be short-time rated motors as indicated. Any other motors of similar duty may have consistent short-time ratings.

TABLE 111.25–15 (a)

Application of motor	Minimum short time rating of motor in hours
Deck winch and direct acting capstan.	½.
Direct acting windlass	¾.
Windlass with hydraulic transmission.	½ hour idle pump operation followed by ¼ hour full load operation.
Steering gear, direct acting.	1.
Steering gear, indirect drive.	Continuous operation at 15 percent load followed by 1 hour at full load.
Watertight door operators.	½.
Lifeboat winches	½.

§ 111.25–20 *Dielectric strength of insulation.* (a) Motors shall be capable of withstanding without damage a dielectric test in accordance with American Standard C50.

§ 111.25–25 *Terminal arrangement.* (a) All motors, except those of the watertight type, shall be provided with terminal leads in terminal boxes secured to the frames. Terminal boxes shall be drip-proof or watertight, consistent with the motor enclosure. The ends of motor terminal leads shall be fitted with connectors. As an alternate to this arrangement, the frames of motors may be fitted with terminal tubes through which the cable shall pass to suitable terminals inside the frame.

§ 111.25–30 *Enclosure and protection*—(a) *General.* Motors for use in the engine room or spaces where subject to mechanical injury, or dripping of oil or water, shall be either of the watertight or drip-proof protected type, or they may be of the open type if protected in accordance with § 111.10–15 (g). Care shall be exercised in locating the latter types high enough to avoid bilge water. Motors below the level of the floor plates shall have all openings for ventilation located above the floor plate level.

(b) *Pump motors.* Motors for operating plunger and close coupled pumps should have the driving end entirely enclosed or designed to prevent leakage from entering the motor.

(c) *Motors for use on weather decks.* Motors for use on weather decks shall be of the watertight type or shall be enclosed in watertight housings.

(d) *Motors installed below decks.* Motors installed below decks should be located in as dry a place as practicable and proximity to steam, water and oil piping should be avoided.

(e) *Motors for hazardous locations.* Motors for use in hazardous locations shall comply with the requirements of § 111.60-40.

§ 111.25-35 *Current ratings.* (a) For continuous duty motors, the current values given in Table 111.25-35 (a) shall be used for the purpose of determining the current-carrying capacity of conductors, switches, branch-circuit overcurrent devices, etc., in lieu of the actual current ratings marked on the motor nameplate. For motors of unusual speeds and for other than continuous duty motors, the nameplate current values shall be used. The motor-running overcurrent protection shall be based on the motor nameplate current rating.

TABLE 111.25-35 (a)—APPROXIMATE FULL-LOAD CURRENTS OF CONTINUOUS DUTY MOTORS [1]

Motor horsepower	Full-load current—amperes					
	D. c. motors		3-phase, a. c. induction motors			
			Squirrel-cage		Wound-rotor	
	115 volts	230 volts	220 volts	440 volts	220 volts	440 volts
½	2.0	1.0	0.90	0.45		
¾	2.6	1.3	1.16	.58		
1	3.2	1.6	1.4	.70		
1½	4.5	2.3	1.9	.95		
2	6.5	3.3	2.6	1.3		
3	8.5	4.3	3.4	1.7	5.4	2.7
5	10.5	5.3				
7½	12.5	6.3	5.0	2.5	6.8	3.4
10	14.5	7.3	5.8	2.9	7.2	3.6
15	16.3	8.3	6.3	3.1	8.0	4.0
20	20.5	10.3	7.6	3.8	8.8	4.4
25	23	12.3	9.0	4.5	10.5	5.3
30	31	16.0				
40	40	19.8	14.5	7.2	16	8.0
50	47	23.4	17.2	8.6	18	9
60	58	28.7	21	10.5	23	11.5
75	68	34.3	24.8	12.4	26	13
100	75	38	26	13.5	29	14.5
125	93	47	34	17	36	18
150	112	56	40	20	42	21
175	131	65	46	23	48	24
200	150	74	52	26	54	27
225	167	83	58	29	60	30
250	185	92	65	32	68	34
275	202	101	70	35	72	36
300	220	110	78	39	80	40
350	257	128	92	46	94	47
400	294	146	102	51	104	52
450	329	163	116	58	116	58
500	364	180	126	63	129	64
600	432	215	152	76	154	77
750	----------	265	188	94	188	94
1000	----------	353	250	125	250	125
1250	----------	440	310	155	310	155
1500	----------	535	370	185	370	185
2000	----------	720	490	245	490	245

[1] Table 111.25-35 (a) gives values that are approximate, and typical only of motors for usual speeds and frequencies. For low speed and special motors, the full-load currents are somewhat higher than the values shown. For this reason, the values shown should be used only for estimating purposes and the selection of cable. They should not be used in the selection of overload relay heaters and coils.

SUBPART 111.30—ELECTRIC COUPLINGS FOR PROPULSION

§ 111.30-1 *General requirements*—(a) *Enclosure and ventilation.* Electrical couplings shall be enclosed and ventilated as required for generators. All windings shall be specially treated to resist moisture, oil and salt air.

(b) *Accessibility for repairs.* The couplings should be designed to permit removal as a unit without moving the engine.

(c) *Excitation.* Excitation should be provided as for propulsion generators and motors.

(d) *Nameplates.* All electric propulsion couplings shall be fitted with nameplates of corrosion-resistant material. The nameplates shall be marked with the following information:

(1) Manufacturer's type and frame designation;
(2) Output (hp.);
(3) Kind of rating;
(4) Design ambient temperature;
(5) Temperature rise at rated load;
(6) Revolutions per minute at rated load;
(7) Voltage;
(8) Exciter voltage; and,
(9) Exciting current in amperes at rated load.

(e) *Temperature limitations.* The limits of temperature rise should be the same as for alternating-current generators, except that when a squirrel cage element is used the temperature of this element may reach such values as are not injurious. Depending upon the cooling arrangements the maximum temperature rise may occur at other than full load rating so that heat runs will require special consideration; for this purpose, when an integral fan is fitted the coupling temperatures should not exceed these limits when operated continuously at 70 percent of full load rpm., full excitation and rated torque.

SUBPART 111.35—SWITCHBOARDS AND PROPULSION CONTROLS

§ 111.35-1 *General requirements*—(a) *General.* Controlling appliances for propulsion and ship's service equipment should include the apparatus necessary for starting, stopping, reversing and controlling the speed of motors, together with essential safety devices. All wearing parts are to be readily renewable.

(b) *Switchboard installation and location.* Switchboards shall be installed in as dry a place as possible and shall be accessible from the front and rear. Switchboards shall be secured to a solid foundation, shall clear deck beams by at least 4 inches, and shall be either self-supported or braced to the bulkhead or deck above. In case the latter method is used, means of bracing shall be flexible to allow deflection of the ship's structure without buckling the control cell or assembly structure. Unless otherwise specifically approved, a clear working space of not less than 36 inches shall be provided in front of switchboards and a working space of not less than the values shown in Table 111.35-1 (b) shall be provided in the rear of switchboards.

TABLE 111.35-1 (b)—WORKING SPACE IN REAR OF SWITCHBOARDS

Potential between phases or conductors of opposite polarity	Switchboard width	Clear working space in rear of switchboard in inches	
		Accessible from one end only	Accessible from both ends
250 volts or less	Single panel not exceeding 42 inches in width	[1] 24	18
	More than one panel or single panel exceeding 42 inches in width.	[1] 30	24
Over 250 volts but less than 600 volts.	Single panel not exceeding 42 inches in width	[1] 30	24
	More than one panel or single panel exceeding 42 inches in width.	[1] 36	30
600 volts or over	Any width	[1] 38	[1] 38

[1] May be reduced not more than 6 inches in way of stiffeners and frame or by equipment on a single panel in the switchboard.

(c) *Switchboard mechanical protection.* The sides of switchboards shall be enclosed and the space in the rear of switchboards made inaccessible to other than qualified persons. Non-conducting mats or gratings shall be provided on deck in the front and rear of switchboards. Non-conducting hand rails at the front and non-conducting guard rails at the rear shall be provided. Each switchboard shall have a drip-cover over the top. Hinged panels of dead front switchboards shall be provided with positioners and stops.

(d) *Switchboard construction.* Panels should be made of impregnated ebony asbestos, laminated phenolic material, or the equivalent. They may be made of metal if the mountings are properly insulated. The supporting framework for all panels is to be of rigid construction. No wood should be used in the construction of switchboards except that a hardwood or non-conducting hand rail should be provided for the protection of personnel from live parts.

(e) *Dead front type switchboard.* Dead front type switchboards should be used where voltage to ground is in excess of 250 volts direct current or 150 volts alternating current.

(f) *Corrosion-resistant parts.* Parts of switchboards and control assemblies liable to damage by corrosion should be made of noncorrodible-material or of material made corrosion resistant.

(g) *Mechanical strength of working parts.* All levers, handles, hand wheels, interlocks and their connecting links, shafts and bearings for the operation of switches and contactors should be of such proportions that they will not be broken or distorted by manual operation.

(h) *Nameplates.* Nameplates shall be provided for each piece of apparatus to indicate clearly its service. Nameplates for feeders and branch circuits shall include the circuit designation, description of the load served, the circuit current-carrying capacity, and the rating or setting of the appropriate overcurrent protective device.

(i) *Protection of instrument circuits.* Except as otherwise provided in this paragraph, instruments, pilot lights, ground detector lights, potential transformers, and other switchboard devices shall be supplied by circuits protected by overcurrent devices. Ship's service generator pilot lights shall be supplied by circuits used for no other purpose.

(1) Circuits, the opening of which would create a hazard in the operation of the vessel, shall not be protected against overcurrent. Such circuits will usually include electric propulsion control circuits, voltage regulator supply circuits, and ship's service generator circuit breaker tripping control circuits.

(j) *Grounding of instruments, relays, meters, and instrument transformers.* Metal cases of instruments, relays, meters, and instrument transformers located on switchboards shall be grounded.

§ 111.35–5 *Switchboard bus bars and wiring*—(a) *General.* Buses shall be designed on the basis of generator capacity and feeder loads. For a single generator, the generator bus shall have a capacity equal to the continuous rating of the generator plus any overload rating in excess of 30 minutes duration. For more than one generator with all generating capacity feeding through one section of the bus, the capacity of the bus for the first generator shall be the same as for a single generator. For each subsequent generator the bus capacity shall be increased by 80 percent of the continuous rating of each added generator. The capacity of connection buses for each generator unit shall be equal to the continuous rating of the generator plus any overload rating in excess of 30 minutes duration. All other bus bars and bus bar connections should be designed for at least 75 percent of the combined full-load rated currents of all apparatus they supply, except that when feeders supply 1 unit or any group of units in continuous operation they should be designed for full load.

(b) *Bus bar rating.* Bus bar sizes shall be not less than that indicated for the ampere ratings in Table 32 (Appendix) of AIEE Standard No. 45.

(c) *Arrangement of bus bars and wiring.* The arrangement of bus bars and wiring on the back of switchboards shall be such that all lugs are readily accessible. Soldering lugs should have a solder contact length at least 1½ times the diameter of the conductor and all nuts and connections should be fitted with efficient locking devices to prevent loosening due to vibration.

(d) *Spacing.* Except at switching mechanisms, contactors, pilot lights, and similar switchboard mounted equipment, the spacings in a switchboard shall be not less than those indicated in Table 111.35–5 (d). Spacings at switchboard mechanisms, contactors, pilot lights, and similar switchboard mounted equipment shall conform to the requirements for the respective equipment as required by this subchapter.

TABLE 111.35–5 (d)—SWITCHBOARD SPACINGS

Voltage involved	Minimum spacing in inches between live parts of opposite polarity		Minimum spacing in inches through air or over surfaces between uninsulated live-metal parts and grounded dead metal
	Over surface	Through air	
125 or less	¾	½	½
126 through 250	1¼	⅝	⅝
251 through 600	[illegible]	1	1

(e) *Switchboard wiring.* Instrument and control wiring should be of the stranded type not smaller than 4000 CM and should have flame-retarding insulation.

§ 111.35–10 *Switchboard mounted equipment*—(a) *General.* Air circuit breaker contacts should be kept at least 12 inches from the ship's structure unless insulation barriers are installed. For live front switchboards the clearance between current carrying parts and base channel should not be less than 4 inches. Voltage regulator element should be totally enclosed. Where rheostats or other devices that may operate at high temperatures are mounted on the switchboard, they should be naturally ventilated and so isolated by barriers as to prevent excessive temperature of copper or adjacent devices. When this cannot be accomplished the rheostat or other device should be mounted separate from the switchboard. In general, all fuses, except for instrument and control circuits, should be mounted on or be accessible from the front of the switchboard. All wiring on the back of boards for voltmeter, pilot and ground lamps should be protected by fuses.

(b) *Equipment.* Contactors, relays, switches, circuit breakers, etc., shall conform to the applicable requirements of such devices given in this subchapter.

(c) *Connections.* The connections between a direct-current generator and the bus bars shall be in accordance with Figures 1 to 10, inclusive, appendix, AIEE Standard No. 45. Other connections not less effective will be considered.

§ 111.35–15 *Ship's service generator and distribution switchboards*—(a) *General.* Ship's service generator and distribution switchboard must provide adequate control of the generation and distribution of electric power.

(b) *Equipment for direct-current switchboards.* For direct-current switchboards, in addition to equipment required by paragraph (a) of this section, there shall be provided at least the equipment listed in this paragraph.

(1) A generator disconnect switch or disconnect links which will completely disconnect the generator and its generator circuit breaker from the bus.

(2) For two-wire machines, an ammeter for each generator and, for three-wire machines, an ammeter for each positive and negative lead and a center zero ammeter in the ground connection at the generator switchboard. Ammeters shall be so located in the circuit as to indicate total generator current.

(3) For each two-wire generator, a voltmeter with voltmeter switch for connecting the voltmeter to indicate generator voltage and bus voltage. Where a shore connection is installed, one of these voltmeter switches shall also provide for reading shore connection voltage.

(4) For each three-wire generator, a voltmeter with voltmeter switch for connecting the voltmeter to indicate generator voltage, positive to negative, and bus voltage positive to negative, positive to neutral, and neutral to negative. Where a shore connection is installed, one of these voltmeter switches shall provide also for reading shore connection voltage, positive to negative, positive to neutral, and neutral to negative.

(5) A field rheostat for each generator.

(6) A pilot lamp for each generator connected between generator and circuit breaker.

(7) Adequate means for ground detection. For three-wire generators see subparagraph (2) of this paragraph. Where the distribution system is isolated electrically into several parts by motor-generator sets or transformers, ground detection shall be provided for each part of the distribution system at the ship's service switchboard. Where ground lamps are supplied for ground detection,

a normally closed spring-return-to-normal switch shall be provided in the ground connection. Ground detector lamps shall be clear (not inside frosted) medium base unobstructed lamps of a rating not less than 25 watts operating at approximately ½ voltage in the absence of grounds.

(c) *Equipment for alternating-current switchboards.* For alternating-current switchboards, in addition to the equipment required by paragraph (a) of this section, there shall be provided at least the equipment listed in this paragraph.

(1) An unfused generator switch or links which will completely disconnect the generator and its circuit breaker from the bus.

(2) An ammeter for each generator with a selector switch to read the current of each phase.

(3) A voltmeter for each generator with voltmeter switch for connecting the voltmeter to read generator voltage of each phase and bus voltage of 1 phase; where a shore connection is installed, one of these voltmeter switches shall provide also for reading voltage of each phase of the shore connection.

(4) A synchroscope and synchronizing lamps with selector switch to provide for paralleling in any combination.

(5) Control for prime mover speed for paralleling.

(6) An indicating wattmeter for each generator.

(7) A frequency meter with selector switch to connect to any generator.

(8) A field rheostat for each generator and each exciter.

(9) A double-pole field switch with discharge clips and resistor for each generator.

NOTE. For generators with variable voltage exciters or rotary amplifier exciters, each controlled by a voltage regulator unit acting on the exciter field, the field switch, the discharge resistor and the generator field rheostat may be omitted.

(10) A pilot lamp for each generator connected between generator and circuit breaker.

(11) A voltage regulator complete with all accessories, including a voltage regulator functional cut-out switch.

(12) Adequate means for ground detection. For details see paragraph (b) (7) of this section.

§ 111.35–20 *Emergency and interior communication switchboards.* Emergency and interior communication switchboards, when fitted, shall comply with the applicable provisions of subpart 111.35 and of Part 112 of this subchapter.

§ 111.35–25 *Electric propulsion control*—(a) *General.* The arrangement of bus bars and wiring on the back of propulsion control assemblies should be such that all parts including the connections are readily accessible. Adequate clearance should be provided between parts of opposite polarity and between live parts and ground to prevent arcing. All nuts and connections should be fitted with locking devices to prevent loosening due to vibration.

(b) *Prime mover control.* Where required by the system of control, means should be provided at the control assembly for controlling the prime mover speed and for mechanically tripping the throttle valve.

(c) *Protection.* The control assembly should be protected at the sides and back by a wire mesh, expanded metal grill, or other means if a bulkhead does not perform this function. The access doors to high voltage compartments should be interlocked to prevent opening unless the main generator field circuit is deenergized. A warning plate giving the maximum voltage inside the enclosure should be provided on all doors entering the enclosure. Where steam and oil gages are mounted on the main control assembly, provision should be made so that the steam or oil will not come in contact with the energized parts in case of leakage.

(d) *Switches.* All switches are to be arranged for manual operation and so designed that they will not open under ordinary shock or vibration; contactors, however, may be operated pneumatically, by solenoids, or by other means in addition to the manual method which should be provided unless otherwise approved. Generator and motor switches should preferably be of the air-break type but for alternating-current systems, where they should be designed to open full load current at full voltage, oil break switches using non-flammable liquid may be used if provided with leakproof non-spilling tanks. Where necessary, field switches should be arranged for discharge resistors, unless discharge resistors are permanently connected across the field. For alternating-current systems, means should be provided for deenergizing the excitation circuits by the unbalance relay and ground relay.

(e) *Interlocks.* All levers for operating contactors, line switches, field switches and similar devices should be interlocked to prevent their improper operation. Interlocks should be provided with the field lever to prevent the opening of any main circuits without first reducing the field excitation to zero, except that when the generators simultaneously supply power to an auxiliary load apart from the propulsion, the field excitation need only be reduced to a low value.

(f) *Instruments and markings.* The necessary instruments to indicate existing conditions at all times are to be provided and mounted on the control panel convenient to the operating levers and switches. Instruments and other devices mounted on the switchboard are to be plainly labeled and the instruments provided with a distinguishing mark to indicate full load conditions. Metallic cases of all permanently installed instruments should be permanently grounded.

(g) *Locations.* Either wheelhouse or engine room control may be used; however, when wheelhouse control is used an arrangement shall be provided whereby the propulsion equipment can also be controlled from the engine room except when otherwise approved for small vessels for limited service. When the equipment is arranged for control from two or more stations, a selector switch shall be provided for connecting the control means to the delegated station. This selector switch shall be interlocked to prevent transfer of the control without removing power and to prevent restarting from the incoming control station until the control is first returned to the "Off" position.

(h) *Indicators.* (1) When two or more control stations are provided, indicating lights should be located at each control to show the station which is in control.

(2) When two or more control stations are provided, additional indicating lights should be located at each control station, except at the engine room control, to show whether the field circuits are energized or deenergized.

(3) A propeller shaft speed indicator should also be provided at each control station.

(i) *Mutiple units.* Systems having two or more propulsion generators or two or more motors on one propeller shaft should be so arranged that any unit may be cut out of service without preventing the operation of the remaining units.

(j) *Ground detection and protection from electrical faults.* Ground detection together with means of protecting the propulsion generators and motors from electrical faults should be provided. For alternating-current systems, the grounding of the generator neutral should be through a resistor which will limit the current at full load rated voltage to not more than 20 amperes upon a fault to ground in the propulsion system. Phase unbalance and ground relays should be provided which will open the generator and motor field circuits upon the occurrence of a fault. For direct-current systems, the ground detector may consist of a voltmeter or lights. Provision should be made for protection against severe overloads, excessive currents, and electrical faults, likely to result in damage to the plant. Protective equipment should be capable of being so set as not to operate on the overloads or overcurrents experienced in a heavy seaway or when maneuvering.

(k) *Features for other services.* If the propulsion generator is used for other purposes than for propulsion, such as dredging, cargo oil pumps, and other special services, overload protection in the auxiliary circuit and means for making voltage adjustments should be provided at the control board. For alternating-current generators means should be provided for making frequency adjustments.

(l) *Electric coupling control equipment.* Electric coupling control equipment should be combined with the prime mover speed and reversing control and should include a disconnect switch, short circuit protection only, ammeter for reading coupling current, discharge resistor and interlocking to prevent energizing the coupling when the prime mover control levers are in an inappropriate position.

§ 111.35–30 *Tests for switchboard and propulsion controls.* (a) Switchboards and propulsion control apparatus shall be capable of meeting the test requirements of paragraph (46), section 35, American Bureau of Shipping Rules for

the Classification and Construction of Steel Vessels.

SUBPART 111.40—DISTRIBUTION PANELBOARDS (SWITCHBOARD AND PANELBOARD TYPES)

§ 111.40–1 *General requirements*—(a) *Location.* Panelboards should be located in accessible positions and not in such spaces as bunkers, storerooms, cargo holds, compartments allotted alternately to passengers or cargo or locations exposed to the weather.

(b) *Enclosure.* The enclosure of distribution panelboards shall be as follows:

(1) *Switchboard type.* Distribution panels of the switchboard type, unless installed in machinery spaces or in compartments assigned exclusively to electric equipment and accessible only to qualified personnel, shall be completely enclosed or otherwise protected against accidental contact and unauthorized operation.

(2) *Panelboard type.* Panelboards not exposed to moisture, and particularly flush mounted panelboards in way of joiner work in passenger and crew accommodations and public spaces, may be of nonwatertight construction. Elsewhere panelboards generally shall be of drip-proof construction.

(3) *Watertight panelboards.* Where panelboards must be located where a watertight enclosure is necessary, the switches shall be externally operative.

(c) *Locking.* The cabinet or enclosing case of panelboards shall be locked closed where accessible to passengers.

(d) *Safety type.* Panelboards for the control of general lighting circuits and panelboards containing voltages to ground in excess of 150 volts shall be of the safety type.

(e) *Construction.* Switchboard type panelboards shall conform to the applicable requirements of Subpart 111.35. Unspecified panelboard construction details shall conform with the requirements of Underwriters' Laboratories, Inc. Standard for Panelboards.

(f) *Switching devices.* Panelboards for distribution to motors, appliances, lighting or other branch circuits, except general alarm circuits, shall be fitted with multipole switches or circuit breakers having a pole for each conductor. Overcurrent protection shall be provided for each ungrounded conductor of feeders and each conductor of branch circuits. For setting of overload devices see Subpart 111.55. The rating of the disconnecting device shall be coordinated with the voltage and current requirements of the load, and in no case less than 30 amperes.

(g) *Number of overcurrent devices on one panelboard.* Not more than 42 overcurrent devices of a lighting or appliance branch circuit panelboard shall be installed in any one cabinet.

(h) *Relative arrangement of switches and fuses.* Panelboards having switches on the load side of any type of fuses shall not be installed.

(i) *Directory.* Panelboard switching units shall be numbered and the panelboard provided with a circuit directory card and card holder. After installation, the directory card shall be marked for each circuit with the circuit designation, description of load served, the circuit current-carrying capacity, and the rating or setting of the appropriate overcurrent protective device.

SUBPART 111.45—MOTOR CIRCUITS AND CONTROLLERS

§ 111.45–1 *Motor controllers, general requirements*—(a) *Suitability.* Each controller shall be capable of starting and stopping the motor which it controls, and for an alternating-current motor shall be capable of interrupting the stalled-rotor current of the motor.

(b) *Rating.* The controller shall have a horsepower rating, which shall not be lower than the horsepower rating of the motor, except as otherwise permitted in this paragraph.

(1) For a stationary motor rated at ⅛ horsepower or less that is normally left running and is so constructed that it cannot be damaged by overload or failure to start, such as clock motors and the like, the branch circuit overcurrent device may serve as the controller.

(2) For stationary motors rated at 2 horsepower or less, and 300 volts or less, the controller may be a general use switch having an ampere rating at least twice the full load current rating of the motor.

(3) For portable motors rated at ⅓ horsepower or less, the controller may be an attachment plug and receptacle.

(4) A branch circuit circuit breaker, rated in amperes only, may be used as a controller. When this circuit breaker is also used for overcurrent protection, it shall conform to the appropriate provisions of this part governing overcurrent protection.

(c) *Need not open all conductors.* Except when the motor controller serves also as a disconnecting means (see § 111.45–30 (l)) the controller need not open all conductors to the motor.

(d) *In grounded conductors.* One pole of the controller may be placed in a permanently grounded conductor provided the controller is so designed that the pole in the grounded conductor cannot be opened without simultaneously opening all conductors of the circuit.

(e) *Adjacent to motor and driven machinery.* Generally a controller shall be located adjacent to the motor and its driven machinery. Where it is desired to group motor controllers at a central location or where, for other reasons, it is not feasible to locate a controller adjacent to the motor and its driven machine, the following conditions shall be complied with:

(1) The motor and controller disconnecting means required by § 111.45–30 shall be capable of being locked in the open position.

(2) Means shall be provided at the motor to start and stop the motor.

(3) Means shall be provided at the motor to prevent starting the motor from a remote location. This means may be a switch in the control circuit.

(4) An alternative arrangement is specifically approved.

(f) *Number of motors served by each controller.* Each motor shall be provided with an individual controller, except that for motors of 600 volts or less, a single controller may serve a group of motors under any one of the conditions covered in this paragraph.

(1) If a number of motors drive several parts of a single machine or piece of apparatus.

(2) If a group of motors is under the protection of one over-current device as permitted in § 111.45–20 (c) (1).

(g) *Adjustable-speed motors.* Adjustable-speed motors, if controlled by means of field regulation, shall be so equipped and connected that they cannot be started under weakened field, unless the motor is designed for such starting.

(h) *Speed limitation.* Machines of the types listed in this paragraph shall be provided with speed limiting devices, unless the inherent characteristics of the machine, the system, or the load and the mechanical connection thereto are such as safely to limit the speed, or unless the machine is always under the manual control of a qualified operator.

(1) Separately excited direct-current motors.

(2) Series motors.

(3) Motor-generators and converters which can be driven at excessive speed from the direct-current end, as by reversal of current or decrease in load.

(i) *Enclosure*—(1) *General.* All controlling apparatus except as otherwise permitted below shall be protected by enclosing cases, either drip-proof or watertight, depending on their location. Cable entrance plates shall be provided on enclosing cases having a volume exceeding 200 cubic inches. When such plates are located at the top, they shall be fitted with gaskets. Watertight enclosures shall be provided with external feet or lugs for mounting.

(2) *Open type.* Control apparatus may be of the open type provided it is located in a compartment or enclosure assigned solely to electrical control equipment and accessible only to qualified persons. Where the compartment is used for other apparatus and the location of an open controller is such that it is subject to accidental contact, adequate guard rails or the equivalent shall be provided.

(j) *Hinged doors.* All controller hinged doors having either a height exceeding 45 inches or a width exceeding 24 inches shall be provided with door positioners and stops. All live parts mounted on a hinged door shall be shielded against accidental contact.

(k) *Grounding.* Controller cases, except insulating covers of snap switches, shall be grounded.

(l) *Construction.* The construction of controlling apparatus and their enclosures shall conform to the requirements of Underwriters' Laboratories, Inc. Standard for Industrial Control Equipment, except that sheet metal enclosures for installation in corrosive locations shall not be installed unless 1 of the conditions covered in this paragraph is complied with.

(1) The enclosure is fabricated of corrosion-resistant material.

(2) The enclosure is fabricated of sheet steel not less than ⅛-inch in thickness and hot dip galvanized after fabrication.

(3) The enclosure is fabricated of sheet steel not less than 3/16-inch in thickness and given a corrosion resistant finish in accordance with § 110.15–40 of this subchapter.

(m) *Wearing parts.* All wearing parts of controllers should be readily accessible for inspection and renewal.

(n) *Protection against low voltage.* Motor controllers for motors of 2 horsepower or larger shall be provided with protection against low voltage. Low-voltage release should be provided only on controllers for auxiliaries which are vital to the operation of the propelling equipment where automatic restart after a voltage failure will not be hazardous. Otherwise, low-voltage protection should be used. To permit prompt restoration of service after interruption, the starting current and short time sustained current of all low-voltage release loads shall be within the capacity of one generator.

(o) *Manually-operated controllers.* Manually-operated controllers shall be arranged for operation without opening the enclosing case. In the panel type the starting arm shall be arranged so that the motor will stop if the arm be left on a starting point. In regulating drum controllers the resistor shall be proportioned for the duty cycle.

(p) *Alternating-current auto-starters.* Alternating-current auto-starters with self contained auto-transformers should be provided with switches of the quick-make-and-break type and the starter should be arranged so that it will be impossible to throw to the running position without having first thrown to the starting position. Switches should be preferably of the contactor or air-break type. In case oil is necessary, the starter should not leak when tilted to an angle of 15 degrees and shou'd be constructed to prevent the liquid from splashing out due to the rolling of the vessel.

(q) *Identification of controllers.* A controller shall be marked with the maker's name or identification symbol, the voltage, the current or horsepower rating, and such other data as may be needed properly to indicate the motor which it controls. Identification nameplate shall be mounted on the external surface of the enclosures. A wiring diagram of the controller shall be permanently attached to the inside of the controller door.

§ 111.45–5 *Motor overcurrent protection*—(a) *General.* The following provisions in this section specify overcurrent devices intended to protect the motors, the motor control apparatus, and the branch-circuit conductors against excessive heating due to motor overloads.

(b) *Continuous duty motors more than one horsepower.* Each continuous duty motor rated more than 1 horsepower shall be protected against overcurrent by one of the means covered in this paragraph.

(1) A separate overcurrent device which is responsive to motor current. This device shall be rated or set at not more than 125 percent of the motor full load current rating. This value may be modified as permitted by paragraph (g) of this section.

(2) A protective device integral with the motor which is responsive to motor current or to both motor current and temperature. This device must be approved for use with the motor which it protects on the basis that it will interrupt current to the motor when the motor is operated in its rated ambient temperature and with overcurrent of not more than 125 percent of the motor full load current. This value may be modified as permitted by paragraph (g) of this section. If the motor current interrupting device is separate from the motor and its control circuit is operated by a protective device integral with the motor, it must be so arranged that the opening of the control circuit will result in interruption of current to the motor.

(c) *Continous duty motors, one horsepower or less, manually started.* Each manually started continuous duty motor rated at one horsepower or less which is within sight from the starter location, shall be considered as protected against overcurrent by the overcurrent device protecting the conductors of the branch circuit. This branch circuit overcurrent device shall not be larger than that specified by Tables 111.45–20 (b1), and 111.45–20 (b2), except that any such motor may be used at 125 volts or less on a branch circuit protected at 20 amperes. Any such motor, which is out of sight from the starter location, shall be protected as specified in paragraph (d) of this section for automatically started motors.

(d) *Continuous duty motors, one horsepower or less, automatically started.* Each continuous duty motor rated at 1 horsepower or less which is automatically started shall be protected against overcurrent by the use of one of the means covered in this paragraph.

(1) In the same manner as provided for motors rated at more than 1 horsepower by paragraph (b) (1) or paragraph (b) (2) of this section.

(2) If part of an approved assembly which does not normally subject the motor to overloads and which is also equipped with other safety controls which protect the motor against damage due to stalled rotor current, the motor will be considered to be protected. Where such protective equipment is used, it shall be indicated on the name plate of the assembly where it will be visible after installation.

(3) If the impedance of the motor windings is sufficient to prevent overheating due to failure to start, the motor may be protected as specified in paragraph (c) of this section for manually started motors.

(e) *Wound-rotor secondaries.* The secondary circuits of wound-rotor alternating-current motors, including conductors, controllers, resistors, etc., shall be considered as protected against overcurrent by the motor-running overcurrent device.

(f) *Intermittent and similar duty.* A motor used for a condition of service which is inherently short time is considered as protected against overcurrent by the branch circuit overcurrent device, provided the overcurrent protection does not exceed that specified in Tables 111.45–20 (b1) and 111.45–20 (b2). Any motor is considered to be for continuous duty unless the nature of the apparatus which it drives is such that the motor cannot operate continuously with load under any condition or unless permitted by § 111.25–15.

(g) *Selection or setting of protective devices.* Where the values specified for motor-running overcurrent protection do not correspond to the standard sizes or rating of fuses, nonadjustable circuit breakers, thermal cutouts, thermal relays, the heating elements of thermal-trip motor switches, or possible settings of adjustable circuit breakers adequate to carry the load, the next higher size, rating, or setting may be used, but not higher than 140 percent of the full-load current rating of the motor. If not shunted during the starting period of the motor (see paragraph (h) of this section), the protective device shall have sufficient time delay to permit the motor to start and accelerate its load.

(h) *Shunting during starting period.* If the motor is manually started (including starting with a magnetic starter having push-button control) the running overcurrent protection may be shunted or cut out of the circuit during the starting period of the motor, provided the device by which the overcurrent protection is shunted or cut out cannot be left in the starting position, and the motor shall be considered as protected against overcurrent during the starting period if fuses or time-delay circuit breakers, rated or set at not over 400 percent of the full-load current of the motor, are so located in the circuit as to be operative during the starting period of the motor. The motor-running overcurrent protection shall not be shunted or cut out during the starting period if the motor is automatically started.

(i) *Fuses; in which conductor.* If fuses are used for motor-running protection, a fuse shall be inserted in each ungrounded conductor, except that a fuse shall also be inserted in a grounded conductor under the circumstances set forth in footnote 1 of Table 111.45–5 (j) for circuits supplied by wye-delta or delta-wye connected transformers.

(j) *Devices other than fuses; in which conductors.* If devices other than fuses are used for motor-running protection, Table 111.45–5 (j) shall govern the minimum allowable number and location of overcurrent units, such as trip coils, relays, or thermal cutouts.

(k) *Number of conductors disconnected by overcurrent device.* Motor-running protective devices, other than fuses or thermal cutouts, shall simultaneously disconnect a sufficient number of ungrounded conductors to interrupt current flow to the motor. It is recommended that all ungrounded conductors

TABLE 111.45-5 (j)

Kind of motor	Supply system	Number and location of overcurrent units, such as trip coils, relays, or thermal cut-outs
1-phase a. c. or d. c.	2-wire, 1-phase a. c. or d. c., ungrounded	1 in either conductor.
1-phase a. c. or d. c.	2-wire, 1-phase a. c. or d. c., one conductor grounded	1 in ungrounded conductor.
1-phase a. c. or d. c.	3-wire, 1-phase a. c. or d. c., grounded-neutral	1 in either ungrounded conductor.
3-phase a. c.	3-wire, 3-phase a. c. ungrounded	2 in any 2 conductors.[1]
3-phase a. c.	3-wire, 3-phase, one conductor grounded	2 in ungrounded conductors.[1]
3-phase a. c.	3-wire, 3-phase a. c., grounded-neutral	2 in any 2 conductors.[1]
3-phase a. c.	4-wire, 3-phase a. c. grounded neutral or ungrounded	2 in any 2 conductors, except the neutral.[1]

[1] In the case of distribution systems supplying wye-delta or delta-wye connected transformers (having the wye neutral point in the primary ungrounded or not connected to the circuit) three running overcurrent units shall be provided for the protection of 3-phase 3-wire motors.

be opened if devices capable of accomplishing this are available.

(l) *Motor controller as running protection.* A motor controller may also serve as the running overcurrent device if the number of overcurrent units complies with Table 111.45-5 (j), and if these overcurrent units are operative in both the starting and running position in the case of a direct-current motor, and in the running position in the case of an alternating-current motor.

(m) *Thermal cutouts and relays.* Thermal cutouts, thermal relays and other devices for motor-running protection which are not capable of opening short circuits, shall be protected by fuses or circuit breakers with ratings or settings of not over 4 times the rating of the motor for which they are designed, unless approved for group installation, and marked to indicate the maximum rating or setting of the overcurrent device by which they must be protected.

(n) *Rating of protective devices.* Motor-running overcurrent devices other than fuses shall have a rating of at least 115 percent of the full load current rating of the motor.

(o) *Automatic restarting.* A motor-running protective device which can restart a motor automatically after overcurrent tripping shall not be installed.

(p) *Steering gear motors; running protection and running indicator lights.* (1) Steering gear motors shall not be provided with a motor-running protective device, nor shall a steering gear motor control circuit be provided with overcurrent protection. In lieu of motor-running overcurrent protection, the motor starter shall be fitted with a compensated overcurrent relay responsive to motor current (and which will follow as closely as practicable the time/temperature curve of the motor) which will operate an indicating light on the propulsion control station in case of overload which would be injurious to the motor.

(2) A pilot light for each steering gear motor shall be provided at the propulsion control station, and other locations if desired, to indicate motor running. The pilot light circuit shall be protected against overcurrent at the steering gear motor controller, and shall be connected across the motor armature circuit in the case of electrohydraulic steering gears and across the motor-field in the case of direct-drive steering gears.

§ 111.45-10 *Remote-control, electrical interlock and indicator circuits*—(a) *General.* The following deviation from the general requirements in this subchapter as covered by this section are intended to provide for peculiar conditions governing remote-control, electrical interlock, and indicator circuits.

(b) *Overcurrent protection.* Conductors of control circuits, indicator light circuits, and electrical interlock circuits of remote-controlled equipment shall be protected against overcurrent in accordance with § 111.55-1 (b) (6), except that such conductors shall be considered as being properly protected by the branch circuit overcurrent devices under any one of the conditions listed in this paragraph.

(1) If the rating or setting of the branch-circuit overcurrent device is not more than 500 percent of the current carrying capacity of the control, interlock, or indicator circuit conductors.

(2) If the controlled device and the point of control (start and stop buttons, pressure switch, thermostatic switch, etc.) are both located on the same machine and the control circuit does not extend beyond the machine.

(3) If the opening of the control circuit would create a hazard.

(c) *Accidental grounds.* It is recommended that remote control circuits be so arranged that an accidental ground will not start the motor.

(d) *Source of potential.* The potential for a control, interlock, or indicator circuit shall be derived from the load side of the motor and controller disconnect means specified by § 111.45-30, except that where the control functions are such that such circuits must be common to two or more controllers, the switching arrangements specified by paragraph (e) of this section, shall be complied with.

(e) *Switching.* In the design of control, interlock, and indicator circuits, all possible steps shall be taken to eliminate more than one source or potential in an enclosure. Where the control functions are such as to make it impracticable to energize a control, interlock, or indicator circuit from the load side of the motor and controller disconnect means specified by § 111.45-30, one of the following alternative methods of switching shall be employed:

(1) The potential of the control, interlock, or indicator circuits shall be limited to not more than 24 volts, in which case no disconnecting means need be provided.

(2) The conductors of control, interlock, or indicator circuits shall be disconnected from all sources of potential by a disconnect device independent of the motor and controller disconnect device specified by § 111.45-30. The two independent devices shall be located immediately adjacent one to the other, and a sign, warning the operator to open both devices to disconnect completely the motor and controller, shall be permanently attached to the exterior of the door of the main disconnect device.

(3) The conductors of control, interlock, or indicator circuits shall be disconnected from all sources of potential by a disconnect device actuated by the opening of the controller door, this device and its connections (including terminal blocks, where employed, for terminating the ships wiring) being such that there are no electrically uninsulated or unshielded surfaces.

§ 111.45-15 *Heater circuits.* Where motors or controllers or both are fitted with electric heaters located inside the enclosures, the heater circuits shall be disconnected in the same manner as required for control interlock, and indicator circuits in § 111.45-10 (e).

§ 111.45-20 *Motor-branch-circuit overcurrent protection*—(a) *General.* The provisions covered by this section specify overcurrent devices intended to protect the motor-branch-circuit conductors, the motor control apparatus, and the motors against overcurrent due to short-circuits or grounds. They are in addition to or amendatory of the provisions of Subpart 111.55.

(b) *Rating or setting for individual motors.* The motor-branch-circuit overcurrent device shall be capable of carrying the starting current to the motor. Overcurrent protection shall be considered as being obtained when this overcurrent device has a rating or setting not exceeding the values given in Tables 111.45-20 (b1) and 111.45-20 (b2).

(1) If the values for motor-branch-circuit protective devices given in Tables 111.45-20 (b1) and 111.45-20 (b2) do not correspond to the standard sizes of fuses or ratings of nonadjustable circuit breakers or possible settings of adjustable circuit breakers adequate to carry the load, the next higher size, rating or setting may be used.

(2) Where the overcurrent protection specified in Tables 111.45-20 (b1) and 111.45-20 (b2) is not sufficient for the starting current of the motor, it may be increased but shall, in no case exceed 400 percent of the motor full-load current.

(3) Table 111.45-20 (b3) tabulates usual values of motor-branch-circuit protection, motor-running protection, and minimum cable size for various motor full-load currents for ease of reference.

TABLE 111.45-20 (b1).—MAXIMUM RATING OR SETTING OF MOTOR-BRANCH-CIRCUIT PROTECTIVE DEVICE FOR MOTORS MARKED WITH A CODE LETTER INDICATING LOCKED ROTOR KVA

Type of motor [3]	Percent of full-load current [1]	
	Fuse rating (see also table 111.45-20 (b3))	Circuit breaker setting; time, limit, type
All a. c. single-phase and polyphase squirrel cage and synchronous motors with full-voltage, resistor or reactor starting:		
Code Letter A	150	150
Code Letter B to E	250	200
Code Letter F to R	300	250
All a. c. squirrel cage and synchronous motors with autotransformer starting:		
Code Letter A	150	150
Code Letter B to E	200	200
Code Letter F to R	250	200

[1] For certain exceptions to the values specified, see pars. 111.45-5 (c), 111.45-20 (b), and 111.45-20 (g).
[2] For motors not marked with a code letter, see Table 111.45-20 (b2).

TABLE 111.45-20 (b2).—MAXIMUM RATING OR SETTING OF MOTOR-BRANCH-CIRCUIT PROTECTIVE DEVICES FOR MOTORS NOT MARKED WITH A CODE LETTER INDICATING LOCKED ROTOR KVA

Type of motor [3]	Percent of full-load current [1]		
	Fuse rating	Circuit breaker setting	
		Instantaneous type	Time limit type
Single-phase, all types	300	--------	250
Squirrel-cage and synchronous (full-voltage, resistor and reactor starting)	300	--------	250
Squirrel-cage and synchronous (autotransformer starting):			
Not more than 30 amperes	250	--------	200
More than 30 amperes	200	--------	200
High-reactance squirrel-cage:			
Not more than 30 amperes	250	--------	250
More than 30 amperes	200	--------	200
Wound rotor	150	--------	150
Direct current:			
Not more than 50 horsepower	150	250	150
More than 50 horsepower	150	175	150

[1] For certain exceptions to the values specified, see pars. 111.45-5 (c), 111.45-20 (b), and 111.45-20 (g).
[2] Synchronous motors of the low-torque low-speed type (usually 450 r. p. m. or lower) such as are used to drive reciprocating compressors, pumps, etc., which start up unloaded, do not require a fuse rating or circuit breaker setting in excess of 200 percent of full-load current.
[3] For motors marked with a code letter, see Table 111.45-20 (b1).

(c) *Several motors on one branch circuit.* Two or more motors may be connected to the same branch circuit under the conditions covered in this paragraph.

(1) Two or more motors each not exceeding 1 horsepower in rating and each having a full-load rated current not exceeding 6 amperes, may be used on a branch circuit protected at not more than 20 amperes at 125 volts or less, or 15 amperes at 600 volts or less. Individual running overcurrent protection is unnecessary for such motors unless required by the provisions of § 111.45-5 (c) or (d).

(2) Two or more motors of any ratings, each having individual running overcurrent protection, may be connected to one branch circuit provided all of the conditions contained in this subparagraph are complied with.

(i) Each motor-running overcurrent device must be approved for group installation.

(ii) Each motor controller must be approved for group installation.

(iii) The branch circuit must be protected by an overcurrent device having a rating or setting equal to that specified in paragraph (b) of this section for the largest motor connected to the branch circuit plus an amount equal to the sum of the full-load current ratings of all other motors connected to the circuit.

(iv) The branch circuit overcurrent protection must not be greater than that allowed by § 111.45-5 (m) for the thermal cutout or relay protecting the smallest motor of the group.

(v) The conductors of any tap supplying a single motor need not have individual branch circuit protection, provided they comply with either of the following: (1) No conductor to the motor shall have a current-carrying capacity less than that of the branch circuit conductors; or (2) no conductor to the motor shall have a current-carrying capacity less than one third that of the branch circuit conductors, with a minimum in accordance with paragraph (b) of this section, the conductors to the motor running protective device being not more than 25 feet long and being protected from mechanical injury.

(d) *Combined overcurrent protection.* Motor-branch-circuit overcurrent protection and motor-running overcurrent protection may be combined in a single overcurrent device if the rating or setting of the device provides the running overcurrent protection specified in § 111.45-5 (b), (c), and (d).

(e) *Overcurrent devices; in which conductor.* Overcurrent devices shall comply with the provisions of Subpart 111.55.

(f) *Rating of circuit breakers.* Circuit breakers for motor-branch-circuit protection shall have a continuous current rating of not less than 115 percent of the full-load current rating of the motors.

(g) *Selection or setting of protective devices.* If the values for branch circuit protective devices required by this section do not correspond to the standard sizes or ratings of fuses, nonadjustable circuit breakers, or thermal devices, or possible settings of adjustable circuit breakers, adequate to carry the load, the next higher size, rating, or setting may be used.

(h) *Steering gear motor branch circuits*—(1) *General.* In lieu of overcurrent protection in accordance with the requirements in paragraphs (a) to (g), inclusive, of this section, each steering gear motor branch circuit shall be protected only by a circuit breaker on the distribution switchboard from which it emanates. No other overcurrent protection shall be provided for a steering gear main motor or for an auxiliary motor vital to the operation of the steering gear.

(2) *Direct-current motors.* For direct-current steering gear motors, each circuit breaker shall be of the instantaneous trip type only, set to trip at a current of not less than 300 percent and not greater than 375 percent of the rated full-load current of one steering gear main motor.

(3) *Alternating-current motors.* For alternating-current steering gear motors, each circuit breaker shall be of the instantaneous trip type only, set to trip at a current of approximately 125 percent of the maximum starting current (short time transient) of one steering gear main motor.

(4) *Use of fuses.* On vessels of a size that may be steered by hand, fused switches may be substituted for the instantaneous trip circuit breakers required by this paragraph: *Provided,* That the arrangement of the steering gear is such that it is possible to shift to hand steering without delay: *And provided further,* That the opening of a steering gear branch circuit fuse is indicated in the wheelhouse.

(5) *Circuit alarm.* The opening of a steering gear motor-branch-circuit circuit breaker shall automatically be indicated at the propulsion control station by the sounding of an audible alarm.

(6) *General considerations.* The requirements of this paragraph contemplate the following conditions:

(i) When two steering gear main motors are provided, one is a standby which normally runs only when started preparatory to change-over, and then without load.

(ii) Auxiliary motors (servo, replenishing and filling pumps, etc.), if and as required, have an aggregate rating of not more than 10 percent of the main steering gear motor rating.

(iii) The steering gear main and auxiliary motors are so arranged as to be supplied from either of two branch circuits.

(iv) For any different arrangement of the steering gear system, including a supply circuit from an emergency switchboard, special consideration and approval will be required.

§ 111.45-25 *Motor feeder overcurrent protection*—(a) *General.* The following provisions contained in this section specify overcurrent devices intended to protect feeder conductors supplying motors against overcurrents due to short-circuits or grounds.

(b) *Rating or setting, motor loads.* (1) A feeder which supplies motors shall be provided with overcurrent protection which shall not be greater than the largest rating or setting of the branch circuit protective device, for any motor of the group (based on Tables 111.45-20 (b1), 111.45-20 (b2) and 111.45-20 (b3)) plus the sum of the full load currents of the other motors of the group.

(2) If two or more motors of equal horsepower rating are the largest in the group, one of these motors should be considered as the largest for the above calculation.

(3) If two or more motors of a group must be started simultaneously, it may be necessary to install larger feeder conductors and correspondingly larger ratings or settings of feeder overcurrent protective devices.

§ 111.45-30 *Disconnecting means*—(a) *General.* The provisions contained in this section are intended to require disconnecting means for motors and con-

TABLE 111.43-20 (b5)—CONDUCTOR SIZE AND OVERCURRENT PROTECTION FOR MOTORS

Full load current rating of motor in amperes	Minimum size conductor AWG and MCM									For running protection of motors (amp.) [1]		Maximum allowable rating or setting of branch circuit protective devices (amp.) [2]			
	1-conductor			2-conductor			3-conductor								
	R	VC	AVC	R	VC	AVC	R	VC	AVC	Maximum rating of nonadjustable protective devices	Maximum setting of adjustable protective devices	With code letters F to V, inclusive, or without code letters. Single-phase and squirrel cage and synchronous. Full voltage, resistor and reactor starting	With code letters B to E, inclusive. Single-phase and squirrel cage and synchronous. Full voltage, resistor or reactor starting. With code letters F to V, inclusive. Autotransformer starting. Without code letters. Squirrel cage and synchronous, auto-transformer starting; high reactance squirrel cage.[3] (Both not more than 30 amps.)	With code letters B to E, inclusive. Squirrel cage and synchronous. Autotransformer starting. Without code letters. Squirrel cage and synchronous, autotransformer starting; high reactance squirrel cage.[3] (Both more than 30 amperes)	With code letter A. All motors. Without code letters. D-C and wound rotor motors
[4] 1	14	12	14	14	12	14	14	12	14	[5] 2	[5] 1.25	15	15	15	15
[4] 2	14	12	14	14	12	14	14	12	14	[5] 3	[5] 2.50	15	15	15	15
[4] 3	14	12	14	14	12	14	14	12	14	[5] 4	[5] 3.75	15	15	15	15
[4] 4	14	12	14	14	12	14	14	12	14	[5] 6	[5] 5.00	15	15	15	15
[4] 5	14	12	14	14	12	14	14	12	14	[5] 8	[5] 6.25	15	15	15	15
[4] 6	14	12	14	14	12	14	14	12	14	[5] 8	[5] 7.50	20	15	15	15
7	14	12	14	14	12	14	14	12	14	[5] 10	[5] 8.75	25	20	15	15
8	14	12	14	14	12	14	14	12	14	[5] 10	[5] 10.00	25	20	20	15
9	14	12	14	14	12	14	14	12	14	[5] 12	[5] 11.25	30	25	20	15
10	14	12	14	14	12	14	14	12	14	[5] 15	[5] 12.50	30	25	20	15
11	14	12	14	14	12	14	14	12	14	[5] 15	[5] 13.75	35	30	25	20
12	14	12	14	14	12	14	14	12	14	15	15.00	40	30	25	20
13	12	12	14	12	12	14	12	12	14	20	16.25	40	35	30	20
14	12	12	14	12	12	14	12	12	12	20	17.50	45	35	30	25
15	12	12	14	12	12	14	12	12	12	20	18.75	45	40	30	25
16	12	12	14	12	12	12	12	12	12	20	20.00	50	40	35	25
17	12	12	12	12	12	12	10	12	12	25	21.25	60	45	35	30
18	12	12	12	10	12	12	10	12	12	25	22.50	60	45	40	30
19	12	12	12	10	12	12	10	10	12	25	23.75	60	50	40	30
20	10	12	12	10	12	12	10	10	12	25	25.00	60	50	40	30
22	10	12	12	10	10	12	10	10	10	30	27.50	70	60	45	35
24	10	12	12	10	10	12	8	10	10	30	30.00	80	60	50	40
26	10	10	12	8	10	10	8	10	10	35	32.50	80	70	60	40
28	8	10	12	8	10	10	8	8	10	35	35.00	90	70	60	45
30	8	10	10	8	10	10	8	8	10	40	37.50	90	70	60	45
32	8	10	10	8	10	10	7	8	8	40	40.00	100	80	60	50
34	8	10	10	7	8	10	7	8	8	45	42.50	110	90	70	60
36	8	10	10	7	8	10	6	8	8	45	45.00	110	90	80	60
38	7	10	10	7	8	8	6	7	8	50	47.50	125	100	80	60
40	7	8	10	6	8	8	5	7	8	50	50.00	125	100	80	60
42	7	8	10	6	8	8	5	6	7	50	52.50	125	110	90	70
44	6	8	8	6	8	8	5	6	7	60	55.00	125	110	90	70
46	6	8	8	5	7	8	4	6	6	60	57.50	150	125	100	70
48	6	8	8	5	7	8	4	6	6	60	60.00	150	125	100	80
50	6	8	8	5	7	7	4	5	6	60	62.50	150	125	100	80
52	5	8	8	4	6	7	4	5	6	70	65.00	175	150	110	80
54	5	7	8	4	6	7	3	5	5	70	67.50	175	150	110	90
56	5	7	8	4	6	7	3	5	5	70	70.00	175	150	120	90
58	4	7	8	4	6	6	3	4	5	70	72.50	175	150	120	90
60	4	6	7	4	5	6	3	4	5	80	75.00	200	150	120	90
62	4	6	7	3	5	6	2	4	4	80	77.50	200	175	125	100
64	4	6	7	3	5	6	2	4	4	80	80.00	200	175	150	100
66	4	6	6	3	5	5	2	3	4	80	82.50	200	175	150	100
68	4	6	6	3	5	5	2	3	4	90	85.00	225	175	150	110
70	3	5	6	2	4	5	1	3	4	90	87.50	225	175	150	110
72	3	5	6	2	4	5	1	3	3	90	90.00	225	200	150	110
74	3	5	6	2	4	5	1	2	3	100	92.50	250	200	150	125
76	3	5	6	2	4	5	1	2	3	100	95.00	250	200	175	125
78	3	5	5	1	3	4	1	2	3	100	97.50	250	200	175	125
80	2	4	5	1	3	4	0	2	3	100	100.00	250	200	175	125
82	2	4	5	1	3	4	0	2	2	110	102.5	250	225	175	125
84	2	4	5	1	3	4	0	1	2	110	105.0	250	225	175	150
86	2	4	5	1	3	4	0	1	2	110	107.5	300	225	175	150
88	1	4	5	1	3	3	0	1	2	110	110.0	300	225	200	150
90	2	4	4	0	2	3	0	1	1	110	112.5	300	225	200	150
92	1	3	4	0	2	3	00	1	1	125	115.0	300	250	200	150
94	1	3	4	0	2	3	00	1	1	125	117.5	300	250	200	150
96	1	3	4	0	2	3	00	1	1	125	120.0	300	250	200	150
98	1	3	4	0	1	3	00	1	1	125	122.5	300	250	200	150
100	1	3	4	0	2	2	00	0	1	125	125.0	300	250	200	150
105	1	2	3	00	1	2	000	0	1	150	131.5	350	300	225	175
110	0	2	3	00	1	2	000	0	0	150	137.5	350	300	225	175
115	0	2	3	00	1	1	000	00	0	150	144.0	350	300	250	175
120	0	2	2	000	0	1	4/0	00	0	150	150.0	400	300	250	200
125	00	1	2	000	0	1	4/0	00	0	175	156.5	400	350	250	200
130	00	1	2	000	0	1	4/0	00	00	175	162.5	400	350	300	200
135	00	1	2	4/0	0	0	4/0	000	00	175	169.0	450	350	300	225
140	00	1	1	4/0	00	0	250	000	00	175	175.0	450	350	300	225
145	000	0	1	4/0	00	0	250	000	00	200	181.5	450	400	300	225
150	000	0	1	4/0	00	0	300	000	000	200	187.5	450	400	300	225
155	000	0	1	4/0	00	00	300	4/0	000	200	194.0	500	400	350	250
160	000	0	0	250	000	00	300	4/0	000	200	200.0	500	400	350	250
165	000	0	0	250	000	00	300	4/0	000	225	206	500	450	350	250
170	4/0	00	0	250	000	00	350	4/0	4/0	225	213	500	450	350	300
175	4/0	00	0	300	000	000	350	250	4/0	225	219	600	450	350	300
180	4/0	00	0	300	4/0	000	350	250	4/0	225	225	600	450	400	300
185	4/0	00	00	300	4/0	000	350	250	4/0	250	231	600	500	400	300
190	4/0	00	00	300	4/0	000	400	250	4/0	250	238	600	500	400	300
195	250	000	00	350	4/0	000	400	300	250	250	244	600	500	400	300
200	250	000	00	350	4/0	4/0	450	300	250	250	250	600	500	400	300
210	250	000	00	350	250	4/0	450	300	250	250	263	----------	600	450	350
220	300	4/0	000	400	250	4/0	500	350	300	300	275	----------	600	450	350
230	300	4/0	000	450	300	250	550	350	300	300	288	----------	600	500	350
240	300	4/0	000	450	300	250	550	400	350	350	300	----------	600	500	400
250	350	250	4/0	500	300	250	600	400	350	300	313	----------	----------	500	400
260	350	250	4/0	500	350	300	650	450	350	350	325	----------	----------	600	400
270	350	250	4/0	550	350	300	650	450	400	350	338	----------	----------	600	450

See footnotes at end of table.

TABLE 111.45-20 (b3)—CONDUCTOR SIZE AND OVERCURRENT PROTECTION FOR MOTORS—Continued

Full load current rating of motor in amperes	Minimum size conductor AWG and MCM									For running protection of motors (amp.) [1]		Maximum allowable rating or setting of branch circuit protective devices (amp.) [2]			
	1-conductor			2-conductor			3-conductor								
	R	VC	AVC	R	VC	AVC	H	VC	AVC	Maximum rating of nonadjustable protective devices	Maximum setting of adjustable protective devices	With code letters F to V, inclusive, or without code letters. Single-phase and squirrel cage and synchronous. Full voltage, resistor and reactor starting	With code letters B to E, inclusive. Single-phase and squirrel cage and synchronous. Full voltage, resistor or reactor starting. With code letters F to V, inclusive. Autotransformer starting. Without code letters. Squirrel cage and synchronous, auto-transformer starting; high reactance squirrel cage.[3] (Both not more than 30 amps.)	With code letters B to E, inclusive. Squirrel cage and synchronous. Autotransformer starting. Without code letters. Squirrel cage and synchronous, autotransformer starting; high reactance squirrel cage.[3] (Both more than 30 amperes)	With code letter A. All motors. Without code letters. D-C and wound rotor motors
280	400	250	250	600	350	300	.....	500	400	350	350	.....	.....	600	450
280	400	300	250	600	400	350	.....	500	450	350	363	.....	.....	600	450
300	450	300	250	650	400	350	.....	550	450	400	375	.....	.....	600	450
320	500	350	300	.....	450	400	.....	600	500	400	400	.....	.....	.....	500
340	550	350	300	.....	500	450	.....	650	550	450	425	.....	.....	.....	600
360	600	400	350	.....	550	450	.....	.....	600	450	450	.....	.....	.....	600
380	650	450	350	.....	600	500	.....	.....	650	500	475	.....	.....	.....	600
400	700	450	400	.....	650	550	.....	.....	.....	500	500	.....	.....	.....	600
420	750	500	450	.....	.....	600	.....	.....	.....	600	525	.....	.....	.....	.....
440	800	550	450	.....	.....	650	.....	.....	.....	600	550	.....	.....	.....	.....
460	850	600	500	.....	.....	.....	.....	.....	.....	600	575	.....	.....	.....	.....
480	950	650	550	.....	.....	.....	.....	.....	.....	600	600	.....	.....	.....	.....
500	1,000	650	550	.....	.....	.....	.....	.....	.....	.....	625	.....	.....	.....	.....

[1] Values may be modified as permitted by § 111.45–5.
[2] Values may be modified as permitted by § 111.45–20.
[3] High-reactance squirrel-cage motors are those designed to limit the starting current by means of deep-slot secondaries or double-wound secondaries and are generally started on full voltage.
[4] For the grouping of small motors under the protection of a single set of fuses, see § 111.45-20 (c).
[5] For running protection of motors of 1 horsepower or less, see § 111.45–5 (c).

trollers capable of disconnecting them from the circuit.

(b) *Type.* The disconnecting means shall be an enclosed, externally operable, motor-circuit switch, rated in horsepower, or a circuit breaker, except as permitted in the paragraphs (c), (d), (e), (f), and (g) of this section. Every switch in the motor branch circuit within sight from the controller location shall comply with these requirements.

(c) *One-eighth horsepower or less.* For stationary motors of ⅛ horsepower or less, the branch-circuit overcurrent device may serve as the disconnecting means.

(d) *Two horsepower or less.* For stationary motors rated at 2 horsepower or less and 300 volts or less, the disconnecting means may be a general-use switch having an ampere rating at least twice the full-load current rating of the motor.

(e) *Over two horsepower to and including 50 horsepower.* The separate disconnecting means required for a motor with a compensator type of controller may be a general-use switch if all of the provisions contained in this paragraph are complied with.

(1) The motor drives a generator which is provided with overcurrent protection.

(2) The compensator is:

(i) Capable of interrupting the stalled rotor current of the motor,

(ii) Provided with a no-voltage release, and

(iii) Provided with running over-current protection not exceeding 125 percent of the motor full load current rating.

(3) Separate fuses or a circuit breaker, rated or set at not more than 150 percent of the motor full load current, are provided in the motor branch circuit.

(f) *Exceeding 50 horsepower.* For stationary motors rated at more than 50 horsepower, the disconnecting means may be a motor-circuit switch also rated in amperes, a general-use switch, or an isolating switch. Isolating and general-use switches for motors exceeding 50 horsepower, not capable of interrupting stalled-rotor currents, shall be plainly marked "Do not open under load."

(g) *Portable motors.* For portable motors an attachment plug and receptacle may serve as the disconnecting means.

(h) *Current-carrying capacity.* The disconnecting means shall have a current-carrying capacity of at least 115 percent of the current rating of the motor.

(i) *Poles; in which conductors.* The disconnecting means shall simultaneously open all conductors.

(j) *To be indicating.* The disconnecting means shall plainly indicate whether it is in the open or closed position.

(k) *To disconnect both motor and controller.* The disconnecting means shall disconnect both the motor and the controller from all supply conductors. The disconnecting means may be in the same enclosure with the controller.

(l) *Switch or circuit breaker as both controller and disconnecting means.* A switch or circuit breaker complying with the provisions of § 111.45–1 (b) may serve as both controller and disconnecting means if it opens all conductors to the motor, is protected by an overcurrent device (which may be the branch circuit fuses) which opens all ungrounded conductors to the switch or circuit breaker, and is one of the types listed in this paragraph.

(1) An air-break switch, operable directly by applying the hand to a lever or handle.

(2) A circuit breaker switch operable directly by applying the hand to a lever or handle.

(3) An oil switch used on a circuit whose rating does not exceed 600 volts or 100 amperes, or on a circuit exceeding this capacity if under expert supervision and by special approval.

(4) The oil switch or circuit breaker specified above may be both power and manually operable. If power operable, provisions shall be made to lock it in the open position. The overcurrent device protecting the controller may be part of the controller assembly or may be separate. A compensator type controller is not included above and will require a separate disconnecting means.

(m) *Panelboard switch as disconnecting means.* A branch-circuit switch or circuit breaker may serve as the disconnecting means, provided it conforms to all the requirements of this section, and is within sight from the controller location.

(n) *In sight from controller location.* The disconecting means shall be located within sight of controller location or be arranged to be locked in the open position. A distance of more than 50 feet is considered equivalent to being out of sight. The disconnecting means shall be located in the same ship's compartment with the controller.

(o) *Motors served by a single disconnecting means.* Each motor shall be provided with individual disconnecting means, except that for motors of 600 volts or less a single disconnecting means may serve a group of motors under any one of the conditions covered in this paragraph. The disconnecting means serving a group of motors shall have a rating not less than is required by paragraph (b) of this section for a single motor whose rating equals the sum of

the horsepowers or currents of all motors of the group.

(1) If a number of motors drive several parts of a single machine or piece of apparatus such as metal and woodworking machines, cranes, and hoists.

(2) If a group of motors is under the protection of one set of overcurrent devices as permitted by § 111.45–20 (c).

(p) *Readily accessible.* The disconnecting means shall be readily accessible.

§ 111.45–35 *Special requirements for over 600 volts*—(a) *General.* The following provisions contained in this section recognize the additional hazard due to the use of high voltage. They are in addition to or amendatory of the other provisions of this subpart.

(b) *Motor overcurrent protection.* Running overcurrent protection for a motor of over 600 volts shall consist of a circuit breaker, or of overcurrent units integral with the controller which shall simultaneously open all ungrounded conductors to the motor. The overcurrent device shall have a setting as specified in § 111.45–5.

(c) *Circuit overcurrent protection.* Each motor branch circuit and feeder of more than 600 volts shall be protected against overcurrent by means of a circuit breaker of suitable rating so arranged that it can be serviced without hazard.

§ 111.45–40 *Group control panels*—(a) *General.* The provisions contained in this section are in addition to and amendatory of the other provisions of this subpart and are applicable to 2 or more motor controllers grouped into a motor control center and supplied by a common feeder.

(b) *Arrangement.* Each controller and its associated motor overcurrent protective device, motor-branch-circuit overcurrent protective device and disconnecting means shall be mounted in a common metal enclosure provided with a hinged door.

(c) *Door interlock.* The hinged door required above shall be interlocked with the disconnect device to prevent the door being opened with the circuit energized.

(d) *Working space.* Working space, generally not less than 30 inches and at no point less than 24 inches, shall be provided in front of group control boards. Where access to the rear is required for making connections and for subsequent inspections, or for other purposes, space adequate for the work to be done, and in no case less than 18 inches, shall be provided.

(e) *Nameplates.* Circuit nameplates in accordance with § 111.35–1 (h) shall be provided.

SUBPART 111.50—DISTRIBUTION AND CIRCUIT LOADS

§ 111.50–1 *Distribution, general requirements*—(a) *General.* All circuits are to be completely metallic and hull return shall not be used for power, heat and light distribution, except when approved for special purposes. Current carrying parts are to be substantially protected against accidental contact. For current carrying capacities of conductors see Tables 111.60–1 (e) (1) (i) and 111.60–1 (e) (1) (ii).

(b) *Circuits derived from auto-transformers.* Branch circuits shall not be supplied through auto-transformers (transformers in which a part of the winding is common to both primary and secondary circuits).

(c) *Polarity identification of conductors.* On systems having a grounded conductor the grounded conductor shall be identified throughout the vessel by means of a white or natural gray conductor outer covering, and any conductor so identified shall not be used as an ungrounded conductor of a circuit unless the conductor is rendered permanently unidentified by painting or other effective means at each outlet. On ungrounded systems, it is recommended that conductor identification be consistent throughout the vessel.

(d) *Connections to screw-shell lampholders.* On branch circuits with a grounded conductor, the screw shell of lampholders shall be connected to the grounded neutral.

(e) *Through feed arrangements.* Where a feeder supplies more than one distribution panel or panelboard, it may be continuous from the switchboard to the farthest panel or it may be severed at any intermediate panel. If the bus bars of any distribution panel or panelboard carry "through" load, the size of the buses should be designed for the total current. The size of feeder conductors should normally be uniform for the total length but may be reduced at any intermediate distribution panel or panelboard provided that the smallest section of the feeder is protected by the overcurrent device at the distribution switchboard.

(f) *Circuits in vicinity of magnetic compass.* Precautions should be taken in connection with apparatus and wiring in the vicinity of the magnetic compass to prevent disturbance of the needle from external magnetic fields.

§ 111.50–5 *Ship's service power circuits*—(a) *Segregation of vital circuits.* Power feeders supplying apparatus required for handling the vessel are not to be used for supplying apparatus which is to be disconnected when the vessel is underway unless the branch circuits for the latter are so arranged that they may be disconnected at panelboards without interfering with the operation or protection of those circuits necessary for the safe operation of the vessel. In general, separate feeders should be run for such groups as engine room and fire room auxiliaries, motors for cargo handling gear, radio transmitters, arc searchlights and ventilation sets.

(b) *Passenger vessels.* On passenger vessels constructed with fire screen bulkheads forming fire zones, distribution systems shall be so arranged that fire in any main fire zone will not interfere with essential services in any other main fire zone. This requirement will be met if main and emergency feeders passing through any zone are separated both vertically and horizontally as widely as is practicable.

(c) *Ventilation systems.* Cargo ventilation fans, machinery spaces ventilating fans, and accommodation ventilating fans shall, if practicable, be supplied by separate feeders. All electrical ventilation systems shall be provided with remote control means for stopping the motors in case of fire or other emergency. For the machinery space ventilation there shall be provided a control located in the passageway leading to, but outside of, the space. For all other ventilation systems, a control station shall be located in the fire control room or wheelhouse, if continuously manned both when underway and when at dock, or in an accessible position in the passageway leading to, but outside of, the space ventilated. These emergency control push button stations shall be protected by installing glass doors on which there will be marked: "In case of fire break glass and push button to stop ventilation." Each push button shall be provided with a nameplate identifying the system with which it is associated. This remote control system shall be of the under-voltage protection type and so arranged that damage to the master switch or cable will automatically stop the fans. For automatic shut-down of mechanical ventilation in spaces protected by a carbon dioxide fire extinguishing system, see § 76.15–35 of Subchapter H (Passenger Vessels) and Part 95 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(1) The requirements of this paragraph shall not be construed to include a closed ventilation system for a motor or generator, diffuser fans for refrigerated spaces, or room circulating fans.

(d) *Steering gear branch circuits.* Branch circuits shall be provided in duplicate from the ship's service switchboard to the steering gear room except in special cases where the length of circuits is very short. Where two branch circuits are fitted, a steering gear transfer panel shall be provided in the steering gear room to permit manual transfer of the steering gear and associated steering gear equipment to either circuit. The transfer panel shall also permit operation of both steering gear motors simultaneously from one steering gear branch circuit when a dual electro-hydraulic system is installed. When an emergency generator is fitted, one of the steering gear circuits may be taken from the emergency switchboard if the rating of the emergency generator permits supply to the steering gear over and above the emergency loads. The branch circuits shall be run so as to minimize the probability of simultaneous damage to both circuits. Each branch circuit shall have a continuous current carrying capacity of not less than (1) 125 percent of the full load rating of one steering gear motor where only one motor can be operated at a time, or (2) 125 percent of the full load rating of one steering gear motor plus 15 percent of the second steering gear motor when one electro-hydraulic unit may be operated idle with the second electro-hydraulic unit operating the steering gear, or (3) 125 percent of the full load rating of one steering gear motor plus 100 percent of the second steering gear motor where both electro-hydraulic units may be operated simultaneously. When steering control systems are supplied from the steering gear transfer panel, the steering control

loads shall be added to the branch circuit loads described in this paragraph.

(e) *Fuel oil service pump branch circuits.* For remote shut-down requirements for fuel oil service systems, see Part 55 of Subchapter F (Marine Engineering) of this chapter.

§ 111.50–10 *Lighting feeders*—(a) *Passenger quarters, crew quarters, and public spaces.* On passenger vessels constructed with fire screen bulkheads forming fire zones, the lighting distribution system shall be so arranged that fire in any main fire zone will not interfere with the lighting in any other main fire zone. This requirement will be met if main and emergency feeders passing through any zone are separated both vertically and horizontally as widely as is practicable, one of which may be an emergency feeder.

(b) *Machinery spaces.* Lighting for engine rooms, for the boiler rooms, and for the auxiliary machinery spaces shall, where practicable, be supplied from two or more feeders.

(c) *Cargo spaces.* Separate feeders shall be provided for cargo space lighting. The distribution panels shall be located outside of the cargo spaces.

(d) *Emergency lighting feeders.* (1) For vessels provided with fire screen bulkheads forming fire zones, at least one emergency lighting feeder shall be provided to supply only the emergency lights between two adjacent main vertical fire zone bulkheads. The emergency lighting feeder shall be separated as widely as possible from the general lighting feeder(s) supplying the same space.

(2) On vessels fitted with an automatic emergency lighting and power system a separate emergency lighting feeder shall be provided for emergency lights located in, or controlled from, the wheelhouse. A distribution panel for these lights with a fused switch or circuit breaker for each branch circuit shall be provided. Circuits to navigation lights not controlled by the navigation light panel, signal lights, and emergency lights on open decks, wheelhouse, chart room and fire control room shall be supplied from this wheelhouse distribution panel. The supply to the navigation light indicator panel shall be a through feed, without switch or overcurrent protection, from the feeder supplying the wheelhouse emergency lighting panel. For overcurrent protection of the feeder supplying a navigation light panel see § 111.55–(1) (b) (9).

(3) On vessels provided with both a temporary and a final emergency lighting source of supply, a separate feeder to the wheelhouse shall be provided for the lifeboat floodlights. This feeder shall supply a distribution panelboard having a fused switch or circuit breaker for each branch circuit. This feeder may be connected to the final emergency lighting source of supply. On vessels without a temporary source of supply, these lights, when provided, may be supplied by the same feeder as other lights controlled from the wheelhouse.

§ 111.50–15 *Lighting branch circuits and lighting requirements*—(a) *General requirements, branch circuits*—(1) *Passageways, public spaces, etc.* The supply to lights in passageways, public spaces, and berthing compartments accommodating more than 25 persons shall be divided between 2 or more branch circuits, one of which may be an emergency.

(2) *Machinery spaces.* Where practicable alternate groups of lights in an engine room, a boiler room, and an auxiliary machinery space shall be arranged so that the failure of one branch circuit will not leave large areas in darkness.

(3) *Lifeboat floodlights.* The arrangement of branch circuits to lifeboat floodlights required by paragraph (e) of this section shall be such that the floodlights at adjacent lifeboats are supplied by different branch circuits.

(4) *Signaling lamp circuit.* A separate branch circuit shall be provided to supply the signaling lamp(s) required by Subpart 113.60 of this subchapter. The branch circuit shall be supplied from the emergency lighting panel required by § 111.50–10 (d) (2) or from a source as approved in the case of vessels not fitted with an emergency lighting and power system.

(b) *General lighting requirements*—(1) *Crew spaces and work spaces.* All spaces where members of the crew are regularly employed or quartered shall be adequately lighted. The minimum standard for natural lighting is that it will be possible on a clear day to read print such as that of an ordinary newspaper in any part of the clear working space. When it is not possible to provide adequate natural lighting, artificial lighting may be accepted on the same basis.

(2) *Washrooms, toiletrooms, etc.* Washrooms, toiletrooms, and hospital spaces are in particular to be well lighted.

(3) *Artificial lighting.* In every space apportioned to the crew, provision shall be made for efficient illumination at night and in dull weather by artificial lighting.

(4) *Berth lights.* Special provisions shall be made for berth lights for each member of the crew.

(c) *Berth lights.* Berth lights shall be permanently mounted and wired without the use of portable cords. The dimensions of the berth light shall inherently prevent the use of a lamp rated at more than 60 watts. The berth light shall have a minimum horizontal projection so that it will be difficult to cover completely the light with bedding.

(d) *Exit lights.* (1) Exit lights are required by § 78.47–40 of Subchapter H (Passenger Vessels) and Part 95 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(2) The word "Exit" shall be in red block letters not less than 2 inches high and of such type that it can be seen from a distance.

(e) *Lifeboat floodlights.* (1) Illumination for lifeboat launching operations is required by § 75.50–10 of Subchapter H (Passenger Vessels) and Part 94 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(2) Lifeboat floodlights shall be arranged so that the floodlights may be quickly directed either to the launching gear or to the lifeboat alongside. Means of training the floodlights shall be positive and shall not require the use of tools. The floodlights shall be connected to the supply circuit by means of a short length of heavy duty portable cord, Type S or the equivalent, and no receptacle outlet shall be employed.

(f) *Receptacle outlets.* A sufficient number of receptacle outlets shall be located throughout crews' accommodations to permit the use of electric razors, radios, and the like without using portable cords of excessive length.

(g) *Pilot ladders.* Means shall be provided and used on all vessels engaged on voyages in which pilots are likely to be embarked at night for illuminating the pilot ladders.

§ 111.50–20 *Circuit loads and demand factors*—(a) *General.* Generator, feeder and bus-tie cables shall be selected on the basis of a computed load of not less than the demand load given in Table 111.50–20 (a).

TABLE 111.50–20 (a)—DEMAND LOADS

Type of circuit	Demand load
Generator cables	125 percent of continuous generator rating.
Switchboard bus-tie, except ship's service to emergency switchboard bus-tie.	75 percent of generating capacity of the larger switchboard.
Emergency switchboard bus-tie	125 percent of continuous rating of emergency generator.
Feeder supplying 2 or more motors	125 percent of the rating of the largest motor plus 100 percent of the sum of ratings of all other motors supplied and including 50 percent of the rating of the spare switches on the distribution panel.[1]
Feeder supplying 2 or more cargo winch motors arranged for the "Burtoning" method of cargo handling.	125 percent of the rating of the largest motor plus 50 percent of the sum of the ratings of all other motors supplied.
Feeder supplying 2 or more cargo winch motors or cargo elevator motors.	125 percent of the rating of the largest motor plus 75 percent of the sum of the ratings of all other motors supplied.
Galley equipment feeder	100 percent of either the first 50 kw. or ½ the connected load, whichever is the larger, plus 65 percent of the remaining connected load.
Lighting feeder	100 percent of the connected load plus the average active circuit load for the spare switches on the distribution panels.
Grounded neutral of a dual voltage feeder	100 percent of the capacity of the ungrounded conductors when grounded neutral is not protected by a circuit breaker overcurrent trip, or not less than 50 percent of the capacity of the ungrounded conductors when the grounded neutral is protected by a circuit breaker overcurrent trip.

[1] Where a large number of motors are supplied from one feeder and the character of the load is such that not all motors will be operated simultaneously, a smaller demand load may be approved.

(b) *Motor branch circuits*—(1) *General.* The branch circuit cables for motor loads shall be not smaller than No. 14 AWG.

(2) *Individual motors.* Branch-circuit conductors supplying a single motor shall have a current carrying capacity not less than 125 percent of the motor full-load current rating. Minimum cable sizes are given in Table 111.45–20 (b3).

(3) *Wound-rotor secondary.* The conductors connecting the secondary of

a wound-rotor alternating-current motor to its controller shall have a current carrying capacity not less than 125 percent of the full-load secondary current of the motor. Where the secondary resistor is separate from the controller, the current carrying capacity of the conductors between the controller and resistor shall be not less than 110 percent of the full-load secondary current.

(4) *Several motors.* Conductors supplying 2 or more motors shall have a current carrying capacity of not less than 125 percent of the full-load current rating of the highest rated motor in the group plus the sum of the full-load current ratings of the remainder of the motors in the group. Also see Table 111.50–20 (a).

(c) *Lighting branch circuits*—(1) *General.* Lighting branch circuit conductors shall be not smaller than No. 14 AWG, except that taps to lampholders within a lighting fixture may be not smaller than No. 18 AWG where the branch circuit is protected by an overcurrent device rated or set at not more than 15 amperes.

(2) *Maximum load.* The connecting load on a lighting branch circuit shall not exceed 880 watts, computed on the basis of the lamp sizes to be installed, but in no case less than 50 watts per outlet. Receptacle outlets provided for the convenience of passengers or crew to which no ship's service apparatus such as room fans, desk lamps, table lamps, etc., will be connected need not be counted as a connected load.

(3) *20-ampere lighting branch circuits.* Lighting branch circuits supplying only fixed nonswitched lighting fixtures for cargo hold or deck lighting may be supplied by 20-ampere branch circuits wired with not less than No. 12 AWG conductors provided all the following conditions are complied with:

(i) Fixture wire or portable cord, if employed in the lighting fixtures, shall not be smaller than No. 14 AWG.

(ii) The connected load shall not exceed 1,800 watts.

(4) *30-ampere lighting branch circuits.* Lighting branch circuits supplying only fixed nonswitched lighting fixtures having only lampholders of the mogul type, or other lampholding devices required for lamps exceeding the maximum rating of medium-base lamps (300 watts), may be supplied by 30-ampere branch circuits wired with not less than No. 10 AWG conductors, provided all of the following conditions are complied with:

(i) Fixture wire, if employed, in wiring the lighting fixtures, shall be not less than No. 12 AWG.

(ii) The connected load shall not exceed 2,700 watts.

(5) *Multi-lamp fixtures.* Multi-lamp fixtures employing a large number of low-wattage lamps, where the total load of the fixture exceeds 880 watts, may be supplied by a polyphase branch circuit provided all the conditions covered in this subparagraph are complied with.

(i) The circuit is controlled from the distribution panelboard only, and branch-circuit switch or circuit breaker has a pole for each circuit conductor.

(ii) The potential between any 2 conductors of the polyphase circuit does not exceed 120 volts.

(iii) The current in any conductor of the polyphase branch circuit does not exceed 7.7 amperes.

(d) *Appliance branch circuits.* Branch circuits which supply appliance loads, electric heater loads, and isolated small motor loads may be connected to distribution panelboards supplying lighting provided the required branch circuit capacity does not exceed 30 amperes.

(e) *Low voltage system, 0 to 50 volts*—(1) *Lighting.* Where a low voltage system is used for lighting, standard lamp sockets and receptacles shall be used, and no branch circuit is to be fitted with more than eight lamp sockets or receptacles. Each lighting branch circuit shall be wired with not less than No. 12 AWG conductors, and shall be protected by fuses of no greater capacity than 20 amperes, except that special circuits supplying appliances shall have receptacles of 20 ampere rating and shall be wired with not less than No. 10 AWG. Where a low voltage, low amperage system is used, such as for interior communication, no electrical connection is to be made to a standard voltage system unless specifically approved.

(2) *Engine starting.* Battery systems for engine starting purpose may be of the one-wire system. The ground lead shall be carried to the engine frame. Means shall be provided for removing the ground from the battery while the battery is being charged.

SUBPART 111.55—OVERCURRENT PROTECTION

§ 111.55–1 *Installation of overcurrent protective devices*—(a) *General requirements.* Overcurrent protection for conductors is provided for the purpose of opening the electric circuit if the current reaches a value which will cause an excessive or dangerous temperature in the conductor or conductor insulation. A grounded conductor is considered to be protected from overcurrent if a protective device of a suitable rating or setting is provided in each ungrounded conductor of the same circuit, except as otherwise required by paragraph (d) of this section. For the minimum size of the grounded neutral conductor of a multiwire feeder see Table 111.50–20 (a).

(b) *Overcurrent protection of conductors.* Conductors shall be protected in accordance with their current carrying capacities, as given in Tables 111.60–1 (e) (1) (i) and 111.60–1 (e) (1) (ii), except as follows:

(1) *Fuses.* If the allowable current-carrying capacity of the conductor does not correspond to a standard size fuse, the next larger size or rating may be used but not exceeding 150 percent of the allowable current-carrying capacity of the conductor. Plug fuses and fuseholders (see § 111.55–15 (b)) shall not be used in circuits exceeding 125 volts between conductors, except circuits of a system having a grounded neutral and no conductor at more than 150 volts to ground. The screw shell of plug type fuseholders shall be connected to the load of the circuit.

(2) *Circuit breakers.* If the allowable current carrying capacity of the conductor does not correspond to a standard rating of circuit breakers, the next larger rating may be used but not exceeding 150 percent of the allowable current carrying capacity of the conductor. The effect of the temperature on the operation of thermally-controlled circuit breakers should be taken into consideration in the application of such circuit breakers when they are subjected to extremely low or extremely high temperatures.

(3) *Fixture wires or flexible cords.* Fixture wire or flexible cord, size No. 16 or No. 18, AWG, shall be considered as protected by 15-ampere overcurrent devices.

(4) *Motor branch circuits.* The conductors of motor branch circuits shall be considered as protected by the overcurrent protective devices specified by § 111.45–5 (b) through (g), and § 111.45–20.

(5) *Motor feeder circuits.* The conductor of motor feeder circuits shall be considered as protected by the overcurrent devices specified by § 111.45–25 (b).

(6) *Remote control, electrical interlock, and indicator circuits.* The conductors of remote control, electrical interlock, and indicator circuits shall be considered as protected by overcurrent devices that are not of the so-called time-lag type and are rated or set at not more than 500 percent of the current-carrying capacity of the circuit conductors.

(7) *Appliance branch circuits.* The rating or setting of branch circuit overcurrent devices shall not be in excess of the current-carrying capacity of the circuit conductors, except as provided in subparagraphs (1) and (2) of this paragraph. If the circuit supplies only a single appliance or device of 10-ampere or more rating, the rating or setting of the branch circuit overcurrent device shall not exceed 150 percent of the rating of the appliance or device.

(8) *Lighting branch circuits.* Lighting branch circuits shall be protected against overcurrent either by fuses rated at not more than 10 amperes or by circuit breakers rated or set at not more than 15 amperes, except that 20-ampere lighting branch circuits complying with the provisions of § 111.50–20 (c) (3) may be protected by overcurrent devices rated or set at not more than 20 amperes, and 30-ampere lighting branch circuits complying with the provisions of § 111.50–20 (c) (4) may be protected by overcurrent devices rated or set at not more than 30 amperes.

(9) *Navigation light circuits.* The feeder supplying a navigation light panel shall be protected by overcurrent devices rated or set at not less than 30 amperes. The navigation light panel shall be fitted with 10-ampere main fuses and with 3-ampere branch circuit fuses as indicated on Figure 113.55–25 (b) of this subchapter.

(10) *Steering gear.* For overcurrent protection of steering gear branch circuits, see § 111.45–20 (h).

(c) *Thermal devices.* Thermal cutouts, thermal relays and other devices not designed to open short-circuits, shall not be used for protection of conductors against overcurrent due to short-circuits or grounds, but may be used to protect

motor branch circuit conductors from overload if said devices are protected in accordance with § 111.45–5 (m).

(d) *Undergrounded conductors.* An overcurrent device (fuse or overcurrent trip unit of a circuit breaker) shall be placed in each undergrounded conductor, except that, on systems having a grounded neutral, a 2-wire branch circuit consisting of one ungrounded conductor and the grounded neutral conductor shall have overcurrent protection in each conductor. In such cases, the grounded neutral overcurrent device shall comply with paragraph (f) of this section. A branch or feeder switch or circuit breaker shall open all conductors of the circuit. Individual single-pole circuit breakers with operating handles yoked together may be used for the protection of each conductor of ungrounded 2-wire circuits.

(e) *Motors.* For motor-running protection the number of overcurrent units shall be as specified in § 111.45–5 (i), (j), and (k).

(f) *Grounded conductor.* No overcurrent device shall be placed in any permanently grounded conductor, except as permitted in this paragraph.

(1) *Simultaneous opening.* When the overcurrent device simultaneously opens all conductors of the circuit.

(2) *Motor-running protection.* For motor-running protection as provided in § 111.45–5 (i) and (j).

(g) *Protection of ship's service generators*—(1) *General.* Generators of less than 25 kw not arranged for parallel operation may be protected by fuses. Generators of 25 kw and over shall be protected by a trip-free air circuit breaker having inverse time overcurrent and instantaneous trips. The time overcurrent device should be set at a value not exceeding 15 percent either above the full-load rating for continuous rated machines or above the overload rating for special rated machines. The instantaneous trip should be set at the lowest value of current which will coordinate with the trip settings of feeder or back-up circuit breakers supplied by the generator.

(2) *Generator circuits for parallel operation.* Direct-current generators arranged for parallel operation should be provided with reverse current circuit breaker trips. Generator ammeter shunts should be so located that the ammeters indicate total generator current. Alternating-current generators arranged for parallel operation should be provided with a reverse power relay.

(h) *Three-wire direct-current generators*—(1) *Circuit breaker poles.* Separate circuit breaker poles should be provided for the positive, negative, neutral and also for the equalizer leads unless protection is provided by the main poles. When equalizer poles are provided for the three-wire generators, the overload trips should be of the "Algebraic" type. No overload trip should be provided for the neutral pole, but the neutral pole should operate simultaneously with the main poles. A neutral overcurrent relay and alarm system should be provided and set to function at a current value equal to the neutral rating.

(2) *Equalizer buses.* For 3-wire generators the circuit breaker shall protect against a short-circuit on the equalizer buses.

(3) *Neutral grounding, main switchboard.* The neutral of 3-wire dual-voltage direct-current systems should be solidly grounded at the generator switchboard with a zero center ammeter in the ground connection. The zero center ammeter shall have a full scale reading of 150 percent of the neutral current rating of the largest generator and be marked to indicate the polarity of grounds. The ground connection should be made in such a manner that it will not prevent checking the insulation resistance of the generator to ground before the generator is connected to the bus. The neutral of 3-wire d-c emergency power systems should be grounded at all times when they are supplied from the emergency generator or storage battery.

(4) *Neutral grounding, emergency switchboard.* No direct ground connection should be provided at the emergency switchboard, the neutral bus or buses being solidly and permanently connected to the neutral bus of the main switchboard. No interrupting device should be provided in the neutral conductor of the bus-tie feeder connecting the two switchboards.

(i) *Propulsion circuits.* Overcurrent protection of propulsion motors, generators, and circuits will require special consideration in each case. For general requirements see § 111.35–25 (j).

§ 111.55–5 *Location of overcurrent protective devices*—(a) *Location in circuit.* Overcurrent devices shall be located at the point where the conductor to be protected receives its supply, except as covered in this paragraph.

(1) The overcurrent protective device for generator conductors shall be located on the generator switchboard.

(2) If the overcurrent device protecting the larger conductors also protects the smaller conductors in accordance with Tables 111.60–1 (e) (1) (i) and 111.60–1 (e) (1) (ii).

(3) If (i) the smaller conductors have a current-carrying capacity of not less than the sum of the allowable current-carrying capacities for the conductors of the one or more circuits or loads supplied, and (ii) the tap is not over 5 feet long and does not extend beyond the switchboard, panelboard, or control device which it supplies.

(4) If the smaller conductors have a current-carrying capacity at least one-third that of the conductor from which they are supplied, and provided the tap is suitably protected from mechanical injury, is not over 25 feet long, and terminates in a single circuit breaker or set of fuses which will limit the load on the tap to that allowed by Tables 111.60–1 (e) (1) (i) and 111.60–1 (e) (1) (ii). Beyond this point the conductors may supply any number of circuit breakers or sets of fuses.

(b) *Location on vessel.* Overcurrent devices shall be located where they will be readily accessible; not exposed to mechanical injury; not in the vicinity of easily ignitable material nor where explosive gas or vapor may accumulate; and, preferably in combination with distribution panelboards, switchboards, motor controllers, etc.

§ 111.55–10 *Enclosures of overcurrent protective devices*—(a) *General.* Overcurrent devices shall be enclosed in metal boxes or cabinets, unless a part of a specially approved assembly which affords equivalent protection, or unless mounted on switchboards, panelboards, or controllers located in compartments or enclosures free from easily ignitible material and accessible only to qualified persons. The operating handle of a circuit breaker may be accessible without opening a door or cover.

(b) *Exposed to weather.* Enclosures for overcurrent devices shall not be installed in locations exposed to the weather, unless unavoidable, in which case the enclosure shall be watertight.

(c) *Disconnection of fuses and thermal cutouts.* Disconnecting means shall be provided on the supply side of all cartridge fuses or thermal cutouts so that each individual circuit containing fuses or thermal cutouts can be independently disconnected from the source of electrical energy except as indicated in this paragraph.

(1) Instrument fuses located on switchboards operating at potentials not exceeding 600 volts need not have a disconnecting device provided a fuse puller is available.

(2) A single disconnecting means may be used to disconnect a group of circuits each protected by fuses or thermal cutouts under the conditions describe in § 111.45–30 (o).

(d) *Arcing or suddenly moving parts.* Arcing or suddenly moving parts shall comply with the requirements of this paragraph.

(1) Fuses and circuit breakers shall be so located or shielded that persons will not be burned or otherwise injured by their operation.

(2) Handles or levers of circuit breakers, and similar parts which may move suddenly in such a way that persons in the vicinity are liable to be injured by being struck by them, shall be guarded or isolated.

§ 111.55–15 *Construction and use of overcurrent devices*—(a) *Plug fuses of the Edison-base type.* Plug fuses of the Edison-base type shall not be employed.

(b) *Plug fuses and fuseholders of type S.* Plug fuses and fuseholders of type S may be employed for applications at not over 125 volts; 0 to 15 amperes, and 16 to 30 amperes.

(c) *Cartridge fuses and fuseholders.* Cartridge fuses may be used for applications not exceeding 600 volts, 0 to 600 amperes.

(d) *Marking of fuses.* Fuses shall be constructed in accordance with Underwriters' Laboratories, Inc., Standard for Fuses and shall be marked with the approval label of Underwriters' Laboratories, Inc.

(e) *Circuit breakers.* Circuit breakers shall conform to the requirements contained in this paragraph.

(1) *Method of operation.* In general, circuit breakers shall be capable of being closed or opened by hand without em-

plcying any other source of power, although normal operation may be by other power, such as electrical, pneumatic, and the like. Large circuit breakers which are to be closed and opened by electrical, pneumatic, or other power shall be capable of being closed by hand for maintenance purposes and shall also be capable of being tripped by hand under load without the use of power.

(2) *Injury to operator.* Circuit breakers shall be arranged and mounted so that their operation is not likely to injure the operator.

(3) *Indication.* Circuit breakers shall indicate whether they are in the open or closed position.

(4) *Non-tamperable.* An air circuit breaker, used for branch circuits, shall be of such design that any alteration of its trip point (calibration), or in the time required for its operation, will be difficult.

(5) *Marking.* Circuit breakers shall be marked with their rating in such a manner that the marking will be visible after installation.

(6) *Construction and interrupting rating.* The construction and rating of feeder and branch-circuit, circuit breakers rated not more than 600 amperes and not more than 600 volts shall conform with the requirements of Underwriters' Laboratories, Inc., Standard for Branch Circuit and Service Circuit Breakers except that thermal trip circuit breakers shall be calibrated for an ambient temperature of 50 degrees C and circuit breakers with interrupting ratings of over 10,000 amperes may be rated in accordance with the National Electrical Manufacturer's Association Large Circuit-Breaker Standard.

(7) *Removable from front.* Circuit breakers of the molded case type when installed on generator or distribution switchboards shall be mounted or arranged in such a manner that the circuit breaker may be removed from the front without first disconnecting copper or cable connections or deenergizing the supply.

§ 111.55–20 *Interrupting rating of fuses and circuit breakers*—(a) *General.* Any circuit breaker or fuse installed at a point in the circuit where the maximum possible short-circuit current exceeds its interrupting rating should be backed up by a circuit breaker with an instantaneous trip setting not more than 90 percent of the interrupting rating of the device protected. The back-up breaker nearest the source of power should have an interrupting rating not less than the maximum short-circuit current available at the point where it is installed.

(b) *Generator circuit breaker as back-up circuit breaker.* Generator circuit breaker(s) shall not serve as the back-up circuit breaker(s) for distribution or feeder circuit breakers.

(c) *Calculation of short-circuit currents.* Unless precise calculations are submitted for review, the maximum short-circuit current of a direct-current system will be assumed to be equal to 10 times the combined normal rated current of all generators (excluding spares) plus 6 times the combined normal rated current of all motors which may be in operation simultaneously. On alternating current systems, the maximum short-circuit current will be assumed to be equal to 10 times the combined normal rated current of all generators (excluding spare(s)) plus 3 times the combined normal rated current of all motors which may be in operation simultaneously.

§ 111.55–25 *System protection*—(a) *General.* Insofar as is possible, the selection, arrangements and performance of the various overcurrent protective devices should be made with the following objectives in mind as described in this paragraph:

(1) *Continuity of service.* Continuity of service under short-circuit conditions through the selective operation of the various protective devices.

(2) *High speed clearance.* High speed clearance of low impedance short-circuits in order that short-circuit currents of large magnitude will cause minimum damage to the system and equipment and minimize the hazard of fire.

SUBPART 111.60—WIRING METHODS AND MATERIALS

§ 111.60–1 *Electric cable*—(a) *General.* The intent and purpose of this section is to provide that conductors shall have mechanical strength, insulation, and current-carrying capacity adequate for the particular conditions under which they are used.

(b) *Construction.* Electric cables shall be constructed and tested by the manufacturer in accordance with the requirements of section 18, AIEE Standard No. 45.

(1) *Classes of cables.* The classes of cables covered by this standard are:

(i) Lighting and power cable;
(ii) Interior communication cable;
(iii) Inter-cabin telephone cable;
(iv) Bell wire; and,
(v) Switchboard wire.

(2) *Cable classes by type of insulation.* The above cables are classed in accordance with the type of conductor insulation as:

(i) Rubber insulated;
(ii) Varnished-cambric insulated;
(iii) Asbestors-varnished-cambric insulated; and,
(iv) Thermoplastic-asbestos insulated.

(3) *Cable classes by type of mechanical covering.* The above cables are classed in accordance with the type of mechanical covering as:

(i) Armored;
(ii) Leaded and armored;
(iii) Impervious sheathed and armored;
(iv) Reinforced rubber sheathed and armored; and
(v) Braided (applicable only to bell wire and switchboard wire).

(c) *Cable marking.* Cable complying with the requirements of this section shall be identified by providing a marker tape under the cable sheath. The marker tape shall give at regular and frequent intervals:

(1) Manufacturer;
(2) Applicable specification; and,
(3) Year of manufacture.

(d) *Cable applications*—(1) *Damp or wet locations.* Electric cable for installation in damp or wet locations shall be leaded and armored, reinforced rubber sheathed and armored, or impervious sheathed and armored. The cable insulation may be either rubber, varnished-cambric, asbestos-varnished-cambric, or thermoplastic-asbestos except that rubber insulated power and lighting cables shall not be used in locations where the ambient temperature exceeds 50° C.

(2) *Corrosive locations.* The armor of cables in corrosive locations shall be either bronze or aluminum.

(3) *Dry locations.* Cables for installation in dry locations shall be either rubber insulated and armored or any of the cables specified in subparagraph (1) of this paragraph for damp or wet locations.

(4) *Power and lighting cable.* Cable for power and lighting applications shall be power and lighting cable of the types described in this subpart.

(5) *Interior communication cable.* Cable for interior communication apparatus operating on potentials not exceeding 300 volts may be either interior communication cable or power and lighting cable of the types described in this subpart.

(6) *Inter-cabin telephone cable.* Inter-cabin telephone cable may be used for telephone systems installed for the convenience of passengers and not essential for the operation of the vessel.

(7) *Bell wire.* Bell wire may be used for call bell circuits of 25 volts or less installed for the convenience of passengers if properly installed in protected raceways.

(8) *Switchboard wire.* Switchboard wire may be used only on switchboards, motor controllers and the like.

(e) *Current-carrying capacity*—(1) *General.* The maximum current-carrying capacities of electric cables for continuous service are given in Tables 111.60–1 (e) (1) (i) and 111.60–1 (e) (1) (ii), and no cable shall be permitted to carry a current continuously in excess of those values.

(2) *Conductors in multiple.* Conductors may be run in multiple provided they are of the same length and have the same circular mil area and type of insulation. Where conductors are run in multiple, they shall be arranged and terminated at both ends in such a manner as to insure equal division of the total current between all conductors that are involved.

(f) *Temperature limitation.* No cable shall be used under such condition that its temperature, even when carrying current, will exceed the temperatures specified in Table 111.60–1 (e) (1) (i) for the type of insulation involved.

(g) *Conductor size for varnished-cambric insulated cables.* Varnished-cambric insulated power and lighting cables in sizes smaller than No. 12 AWG shall not be used. Rubber or asbestos-varnished-cambric insulated power and lighting cables may be used in size No. 14 AWG and larger.

TABLE 111.60–1 (c) (1) (i)—WIRES AND CABLES [1]—MAXIMUM CURRENT CARRYING CAPACITIES, D-C., FOR CONTINUOUS SERVICE, 50° C. AMBIENT [2] [3] (CONCENTRIC STRANDING, 600 VOLTS [4] OR LESS, D. C.) (ALTERNATING-CURRENT RATINGS FOR CABLES ARE THE SAME AS GIVEN FOR DIRECT CURRENT UP TO 700,000 CIRCULAR MILS; FOR 700,000 CIRCULAR MILS AND ABOVE, SEE TABLE 111.60–1 (c) (1) (ii))

Conductor size		Current in amperes								
		1-conductor			2-conductor			3-conductor		
Area (CM)	Nearest AWG	R	VC	AVC	R	VC	AVC	R	VC	AVC
2,000,000	------	1,048	1,380	1,538	-----	-----	-----	-----	-----	-----
1,750,000	------	934	1,231	1,373	-----	-----	-----	-----	-----	-----
1,500,000	------	846	1,095	1,228	-----	-----	-----	-----	-----	-----
1,250,000	------	743	970	1,020	-----	-----	-----	-----	-----	-----
1,000,000	------	640	831	925	-----	-----	-----	-----	-----	-----
950,000	------	617	812	904	-----	-----	-----	-----	-----	-----
900,000	------	592	779	866	-----	-----	-----	-----	-----	-----
850,000	------	578	752	838	-----	-----	-----	-----	-----	-----
800,000	------	557	725	807	-----	-----	-----	-----	-----	-----
750,000	------	538	696	776	-----	-----	-----	-----	-----	-----
700,000	------	516	666	741	-----	-----	-----	-----	-----	-----
650,000	------	486	623	694	382	503	560	331	428	476
600,000	------	466	597	665	363	481	535	317	407	452
550,000	------	441	563	627	344	462	514	302	386	428
500,000	------	418	544	594	323	431	480	285	367	408
450,000	------	392	498	554	306	406	452	265	341	379
400,000	------	369	464	516	284	377	418	248	319	354
350,000	------	340	429	477	261	351	390	230	294	327
300,000	------	301	389	432	238	315	351	209	267	297
250,000	------	270	348	387	212	281	312	186	238	264
212,000	4/0	241	310	345	193	254	283	169	215	239
168,000	3/0	208	273	304	167	223	248	148	187	208
133,000	2/0	180	237	264	145	194	214	130	163	181
106,000	1/0	155	206	229	128	170	189	112	142	158
83,700	1	133	177	197	111	148	165	98	122	135
66,400	2	115	152	169	96	128	142	86	106	118
52,600	3	99	132	147	85	111	124	75	92	102
41,700	4	85	114	127	74	97	108	66	80	89
33,100	5	71	99	110	64	85	95	57	70	78
26,300	6	63	86	96	56	74	82	49	61	67
20,800	7	54	74	82	49	64	71	44	52	58
16,500	8	46	66	73	42	55	61	39	46	51
10,400	10	34	49	54	32	42	47	29	35	39
6,530	12	24	32	35	22	27	30	21	23	26
4,110	14	15	-----	20	14	-----	19	13	-----	17

[1] The values given in this table may be used provided the cable installation is limited to double banking. Where this limitation is exceeded, the values given in this table shall be decreased 5 percent for each additional bank.

[2] The values given in this table are based upon an ambient temperature of 50° C and maximum conductor temperature of:

75° C for rubber (R) insulated cables;
85° C for varnished-cambric (VC) insulated cables; and
95° C for asbestos-varnished-cambric (AVC) insulated cables.

[3] If ambient temperatures differ from 50° C the values shown above shall be multiplied by the following factors:

Type of cables	Ambient temperature		
	40° C	60° C	70° C
Rubber-insulated cables	1.18	-----	-----
Varnished cambric-insulated cables	1.13	0.84	-----
Asbestos-varnished-cambric insulated cables	1.11	0.88	0.75

[4] For voltages greater than 600 volts, current rating shall be decreased 2 percent for each thousand volts increased over 600 volts.

TABLE 111.60–1 (c) (1) (ii) [1]—WIRES AND CABLES—MAXIMUM CURRENT-CARRYING CAPACITIES, A. C., FOR CONTINUOUS SERVICE (VALUES ARE IN AMPERES—600 VOLTS OR LESS) (ALTERNATING-CURRENT RATINGS FOR CABLES OF LESS THAN 700,000 CIRCULAR MILS ARE THE SAME AS THOSE FOR CABLES GIVEN IN TABLE 111.60–1 (c) (1) (i))

[60-cycle alternating current]

Conductor size	Concentrically stranded conductor			Annular conductor	
Area in circular mils	Rubber insulated	Varnished-cambric insulated	Asbestos-varnished-cambric insulated	Varnished-cambric insulated	Asbestos-varnished-cambric insulated
2,000,000	932	1,229	1,440	1,417	1,590
1,750,000	864	1,125	1,305	1,294	1,450
1,500,000	791	1,023	1,199	1,160	1,315
1,250,000	719	920	1,070	1,021	1,150
1,000,000	631	808	925	877	990
950,000	609	790	899	840	955
900,000	587	760	867	803	920
850,000	568	735	838	777	885
800,000	548	711	803	747	848
750,000	529	683	775	708	810
700,000	509	656	740	675	775

[1] Footnotes 1, 2, 3, and 4 of Table 111.60–1 (c) (1) (i) are applicable to this table.

§ 111.60–5 *Portable electric cord and fixture wire*—(a) *General.* The construction of portable electric cords and fixture wire shall be in accordance with Underwriters' Laboratories, Inc. Standard for Flexible Cord and Fixture Wire.

(b) *Application, portable cords.* Portable cords may be used only for the connection of portable lamps or appliances and for the connection of stationary lamps or small stationary equipment not suitable for fixed wiring. When used they shall be of the type indicated in this paragraph or better.

(1) *Damp or wet locations.* Portable cords for use in damp or wet locations shall be type S, ST, or SU, and portable cords for use where exposed to oil or oil vapor shall be type SO, or SUO.

(2) *Dry locations.* Portable cords for use in dry locations and not for hard services shall be type K, SJ, SJO, SJT, C, PD, P–2, PW–2, AVPD, or one of the types listed for damp or wet locations in subparagraph (1) of this paragraph.

(3) *Hard service.* Any portable cord subject to hard service shall be one of the types specified in subparagraph (1) of this paragraph for damp or wet locations.

(c) *Allowable current-carrying capacity.* The allowable current-carrying capacity of flexible cord and fixture wire is given in Table 111.60–5 (c).

(d) *Conductor size.* Portable cord or fixture wire shall not be smaller than No. 18 AWG.

(e) *Splices.* Portable cords shall be used only in continuous lengths without splices or taps.

(f) *Pull at joints and terminals.* Portable cords shall be so connected to devices and to fittings that tension will not be transmitted to joints or terminal screws. This shall be accomplished by a knot in the cord, winding with tape, by a special fitting designed for that purpose, or by other equivalent means.

(g) *Fixture wire, application.* Fixture wire may be used in the interior of lighting fixtures, instruments, and the like. When used, fixture wire shall be one of the types covered in this paragraph.

(1) Type AF fixture wire shall be used for applications where the temperature will exceed 90 degrees C and for the wiring of all mogul base screw-shell lampholders.

(2) Type AF fixture wire shall be used for wiring lighting fixtures provided with other than mogul base screw-shell lampholders, except that type CF fixture wire may be used where the temperature does not exceed 90 degrees C., types RFH–2 and FFH–2 fixture wire may be used where the temperature does not exceed 75 degrees C., and types TF, TFF, RF–2, and FF–2 fixture wire may be used where the temperature does not exceed 60 degrees C.

(h) *Fixture wire, voltage limitation.* Fixture wire shall not be used for applications exceeding 300 volts.

(i) *Fixture wire, stranded.* Fixture wire shall be of the stranded type.

TABLE III.60–5 (c)—MAXIMUM CURRENT-CARRYING CAPACITIES IN AMPERES

Size AWG	Flexible cord: Rubber types PW–2, P–2, C, PD	Flexible cord: Rubber types S, SO, SJ, SJO, SU, SUO	Flexible cord: Thermoplastic types ST, SJT	Flexible cord: Type AVPD	Fixture wire: Rubber types RF–2, FF–2, RFH–2, FFH–2	Fixture wire: Thermoplastic types TF, TFF	Fixture wire: Cotton type CF	Fixture wire: Asbestos type AF
18	5	7		17	5	6		
16	7	10		22	7	8		
14	15	15		28	-------	17		
12	20	20		36	-------	-------		
10	25	25		47	-------	-------		
8	35	-------		-------	-------	-------		
6	45	-------		-------	-------	-------		
4	60	-------		-------	-------	-------		
2	80	-------		-------	-------	-------		

§ 111.60–10 *Wire and cable installation*—(a) *Propulsion cables*—(1) *Splices and terminals.* Propulsion cables are to have no splices or joints except terminal joints and all cable terminals are to be effectively sealed against the admission of moisture or air; similar precautions should be taken during installation by sealing all cable ends until the terminals are permanently attached. Cable supports are to be strong enough to withstand short-circuited conditions; they are not to be spaced more than 36 inches apart and are to be arranged to prevent chafing of the cable.

(2) *Single-conductor alternating-current cables.* Single-conductor alternating-current cables are to be supported on non-fragile insulators and the protective metal covering of each run of cable should be grounded at the middle only. Closed magnetic circuits around individual cables are not permitted and magnetic materials between cables of a group should be avoided. In order to minimize harmful inductive effect, cables in groups of considerable length should be transposed.

(3) *Multi-conductor alternating-current cables.* Multi-conductor alternating current cables are to be mounted on approved supports and the lead sheath grounded at several points.

(4) *Deck and bulkhead penetrations.* Deck and bulkhead penetration shall comply with the requirements of paragraph (b) (4) of this section.

(b) *Ship's service cables*—(1) *Cable joints and sealing.* The cable ends of all feeders and power branch circuits to vital auxiliaries are to be effectively sealed against the admission of moisture by methods such as taping in combination with insulating compound.

(2) *Cable supports and radii of bends.* Where cables are run in groups they should preferably be supported in metal hangers arranged as far as practicable to permit painting of the surrounding structure without undue disturbance to the installation. Single cable runs may be supported by metal clips screwed directly to deck or bulkhead. Cables grouped in a single hanger should be limited preferably to two banks. Supports are to be spaced no more than 18 inches apart where vertical and 14 inches where horizontal. Cables running transversely to and supported by clips or straps on the under side of beams should be run on backing plates or the equivalent. Metal supports should be designed to secure cables without damage to insulation or armor and are to be so arranged that the cables will bear over a length of at least ½ inch. Leaded and armored cable shall not be bent to a smaller radius than 8-cable diameters; other cables may be bent to a 6-cable diameter radius.

(3) *Alternating-current cable installations.* In order to avoid overheating by induction all phase wires should be contained within the same armor by use of multiple conductor cables. Single-conductor cables may be used, however, where carrying negligible currents or where there are no closed magnetic circuits around the individual cables. In order to minimize harmful inductive effects, single-conductor cables in groups of considerable length should be transposed.

(4) *Deck and bulkhead penetrations.* Where cables pass through watertight decks or bulkheads, a watertight stuffing tube shall be employed. Where cables pass through nonwatertight bulkheads, beams, or similar structural parts where the bearing surface is less than ¼-inch, the holes shall be fitted with bushings having rounded edges and a bearing surface for the cable of at least ¼-inch in length. Where cables pass through nonwatertight bulkheads, deck beams, or similar structural parts where the bearing surface is ¼-inch or greater in length, all burrs shall be removed in way of the hole and sharp edges shall be eliminated. Where cables pierce main vertical zone bulkheads, arrangements shall be made to ensure that the fire-resistance of the bulkheads is not impaired.

(5) *Grounding of cable metallic covering.* Each lead covered cable and each armored cable is to have the metallic covering electrically and mechanically continuous and grounded to the metal hull at each end of the run except that final sub-circuits may be grounded at the supply end only.

(6) *Mechanical protection.* All cables in bunkers and where particularly liable to damage such as locations in way of cargo ports, hatches, tank tops, and where passing through decks shall be specially protected by removable metal coverings, angle irons, pipe or other equivalent means. All such metallic coverings are to be electrically continuous and effectively grounded to the metal hull. Horizontal pipes or the equivalent used for cable protection should be provided with adequate drainage holes and where they are carried through decks or bulkheads, arrangements should be made to insure the integrity of the water or gas tightness of the structure.

(7) *Generator cables.* Generator cables are not to be installed in the bilges.

(8) *Feeder cables.* Feeders of every description should be located with a view to avoiding, as far as practicable, spaces where excessive heat and gases may be encountered, also spaces where they may be exposed to damage such as cargo spaces and exposed sides of deck houses. Electrical conductors should not enter oil tanks nor should they pass through cofferdams immediately adjacent to and extending below the top of the oil tanks except that branch circuits may be installed in accordance with § 111.60–40.

(9) *Cables behind paneling.* Cables may be installed behind paneling provided all connections are readily accessible and the location of concealed connection boxes is indicated.

(10) *Cables behind sheathing.* Cables may be installed behind sheathing but they must not be installed behind nor imbedded in structural insulation; they should pass through such insulation at right angles and should be protected by continuous pipe with a watertight stuffing tube at each end.

(11) *Bell wire.* Bell wire may be run in tubing or moulding or the equivalent. All splices are to be made at outlets or connection boxes.

(12) *Standing rigging.* All standing rigging should be permanently grounded.

§ 111.60–15 *General requirements for wiring methods*—(a) *Feeder and branch continuity.* Feeders and branch circuit cable supplying a single energy consuming appliance shall be continuous throughout its length, except that a cable of large size or exceptional length may be spliced in suitable junction box to effect greater ease of installation.

(b) *Boxes at outlets.* An outlet box shall be installed at each outlet, switch, receptacle, or junction point. In the complete installation, each outlet or junction box shall be provided with a cover unless a fixture canopy, switch cover, receptacle cover, etc., is used.

(c) *Cables entering boxes.* Cables entering boxes or fittings shall be protected from abrasion, and shall conform to the requirements of this paragraph.

(1) Opening through which conductors enter shall be adequately closed.

(2) The cable armor shall be secured to the box or fitting.

(3) When used in damp or wet locations, the cable entrance shall be made watertight by means of a terminal or stuffing tube.

(d) *Splices and taps.* (1) Conductors shall be so spliced or joined as to be mechanically and electrically secure without solder and, unless an approved splicing device is used, shall then be either soldered with a fusible metal or alloy, or brazed or welded. All splices and joints shall be covered with an insulation equivalent to that on the original conductor.

(2) If not subjected to a temperature higher than 75 degrees C, a splice or

joint shall be covered with rubber or thermoplastic tape secured in place by an outer winding of friction tape, or with a standard combination tape or as specified in subparagraph (3) or (4) of this paragraph.

(3) If subjected to a temperature higher than 75 degrees C but not higher than 90 degrees C, a splice or joint shall be covered with asbestos cord or tape secured in place by an outer winding of friction tape or bonded with water-glass (sodium silicate) or as specified in subparagraph (4) of this paragraph.

(4) If subjected to a temperature higher than 90 degrees C, a splice or joint shall be covered with asbestos cord or tape bonded with water-glass.

(5) Other methods of insulating splices and taps, such as wrapping with layers of varnished-cambric tape followed by painting with insulating varnish, when properly done, are also acceptable.

(6) Rubber and thermoplastic insulating tapes shall be of a type listed as approved by Underwriters' Laboratories, Inc.

(e) *Connections to terminals.* (1) Connection of conductors to terminal parts shall insure a thoroughly good connection without damaging the conductors and shall be made by means of pressure connectors, solder lugs, or splices to flexible leads either soldered, brazed, or welded, except that No. 10 or smaller conductors may be connected by means of clamps or screws with terminal plates having upturned lugs. Terminals for more than one conductor shall be of a type approved for that purpose.

(2) Connectors, wire nuts, or lugs of the set-screw type shall not be used with stranded conductors smaller than No. 14 AWG unless provided with a non-rotating follower traveling with the set screw and making pressure contact with the conductor.

(3) Pressure-type wire connectors, fixture splicing connectors, and soldering lugs shall conform to the requirements of Underwriters' Laboratories, Inc. Standard for Wire Connectors and Soldering Lugs, and shall be so listed by Underwriters' Laboratories, Inc.

(4) Terminal blocks shall employ terminal screws not smaller than 6–32, and spacings not less than that shown in Table 111.60–15 (e) (4).

TABLE 111.60–15 (e) (4)

Voltage involved	Minimum spacings in inches between parts of opposite polarity and between live parts and ground	
	Through air	Over surface
0–250	1/4	3/4
251–600	3/8	3/8

§ 111.60–20 *Outlet boxes*—(a) *General.* The requirements covered by this section are applicable to outlet boxes for use with lighting fixtures, wiring devices, and the like having a volume not more than 100 cubic inches. Boxes of large size will require special consideration for each installation.

(b) *Size.* Outlet boxes shall have an internal depth of at least 1½ inches. The free space within an outlet box for each conductor, not counting fixture wires, shall be not less than that given in Table 111.60–20 (b). Table 111.60–20 (b) applies where no fitting or devices, such as cable clamps, hickeys, switches or receptacles are contained in the box. Where one or more such devices are contained in the box, each such device shall count as one conductor. Each conductor terminated in the box is counted as one conductor.

TABLE 111.60–20 (b)

AWG size of conductor, No.	Free space in cubic inches for each conductor within box
14	2.0
12	2.25
10	2.5
8	3.0

(c) *Degree of enclosure.* Outlet boxes for use in damp or wet locations shall be of watertight construction.

(d) *Mounting and grounding.* Outlet boxes shall be securely fastened in place and grounded to the hull of the vessel. Outlet boxes of watertight construction shall have external mounting feet or lugs.

(e) *Penetration of walls.* Holes in the walls of watertight outlet boxes for the purpose of providing means for the attachment of parts on the exterior thereof, or for securing the cover and the like, shall not penetrate the total thickness of the box wall.

(f) *Construction.* The construction of outlet boxes shall conform with the requirements of Underwriters' Laboratories, Inc. Standard for Outlet Boxes and Fittings, except that sheet steel outlet boxes shall not be installed in corrosive locations.

§ 111.60–25 *Switches and circuit breakers*—(a) *General requirements*—(1) *Grounded conductor.* No switch or circuit breaker shall disconnect the grounded conductor of a circuit unless the switch or circuit breaker simultaneously disconnects the ungrounded conductor or conductors.

(2) *Three-way and four-way switches.* Three-way and four-way switches shall be so wired that all switching is done only in the ungrounded circuit conductor.

(3) *Enclosures.* Switches and circuit breakers, except pendent and surface type snap switches and knife switches mounted on an open face switchboard or panelboard, shall be of the externally operative type enclosed in metal boxes or cabinets.

(4) *Position of knife switches.* Single-throw knife switches shall be so placed that gravity will not tend to close them. Double-throw knife switches may be mounted so that the throw will be either vertical or horizontal as preferred, but if the throw be vertical a locking device shall be provided which will insure the blade remaining in the open position when so set.

(5) *Circuit connections.* Knife switches, unless of the double-throw type, shall be so connected that the blades are dead when the switch is in the open position. Circuits shall be connected to the fuse end of switches and to the coil end of circuit breakers, except that generators or incoming feeders may be connected to either end of circuit breakers.

(6) *Accessibility and grouping.* Switches and circuit breakers, so far as practicable, shall be readily accessible and shall be grouped.

(7) *Circuit breakers as switches.* A circuit breaker operable directly by applying the hand to a lever or handle may serve as a switch provided it has the number of poles required for such switch.

(8) *Grounding of enclosures.* Enclosures for switches or circuit breakers shall be grounded.

(9) *Knife switches.* Knife switches rated for more than 1,200 amperes at 250 volts or less, and for more than 600 amperes at 251 to 600 volts shall be used only as isolating switches and shall not be opened under load. To interrupt currents greater than 1,200 amperes at 250 volts or less, or 600 amperes at 251 to 600 volts, a circuit breaker or a switch of special design approved for such purpose shall be used. Knife switches of lower rating may be used as general-use switches and may be opened under load. Motor-circuit switches may be of the knife-switch type. (See § 111.45–30 (d), (e), and (f).)

(10) *Rating of snap switches.* Snap switches shall be rated as described in this paragraph depending upon the load controlled.

(i) *Non-inductive loads.* For non-inductive loads other than tungsten-filament lamps, switches shall have an ampere rating not less than the ampere rating of the load.

(ii) *Tungsten filament lamp loads.* For tungsten-filament lamp loads, and for combined tungsten-filament and non-inductive loads, switches shall have a "T" rating not less than the ampere rating of the load.

(iii) *Inductive loads.* Switches controlling inductive loads shall have an ampere rating twice the ampere rating of the load unless they are of a type approved as part of an assembly or for the purpose employed.

(iv) *Motor-circuit switches.* For switches controlling motors see §§ 111.45–30 and 111.60–25 (b) (4).

(b) *Detail requirements*—(1) *Circuit breakers.* Circuit breakers shall comply with § 111.55–15 (e).

(2) *Knife switches.* The construction of knife switches shall conform to the requirements of Underwriters' Laboratories, Inc. Standard for Knife Switches.

(3) *Snap switches.* The construction of snap switches shall conform with the requirements of Underwriters' Laboratories, Inc. Standard for Snap Switches and the switches shall be so labeled. The switches when installed in an outlet box and wired shall have a minimum spacing between live parts and ground of ¼-inch through air or over surfaces for potentials of 250 volts or less.

(4) *Enclosed switches.* Enclosed switches shall conform to the requirements of Underwriters' Laboratories, Inc. Standard for Enclosed Switches, except that sheet metal enclosures shall not be employed for use in corrosive locations unless one of the conditions cov-

ered in this subparagraph is complied with.

(i) The enclosure is fabricated of corrosion-resistant material.

(ii) The enclosure is fabricated of sheet steel not less than ⅛ inch in thickness and hot dip galvanized after fabrication.

(iii) The enclosure is fabricated of sheet steel not less than 3/16 inch in thickness and given a corrosion-resistant finish in accordance with § 110.15–40 of this subchapter.

§ 111.60–30 *Receptacle outlet and attachment plugs.* (a) Receptacle outlets and attachment plugs for the attachment of portable lamps, tools, and similar apparatus supplied as ship's equipment and operating at 100 volts or more shall provide a grounding pole and a grounding conductor in the portable cord to ground the dead metal parts of the portable apparatus. Portable apparatus shall be deemed to be any apparatus served by means of a flexible extension cord, whether the apparatus is permanently mounted or not.

(b) Receptacle outlets provided for the convenience of, and located in quarters for, passengers or crew for connecting portable razors, radios, and other such appliances need not be of the type providing a grounding pole if operating at a potential of 125 volts or less.

(c) Receptacle outlets of the type providing a grounding pole shall be of a distinctive design that will not accommodate nongrounding plugs, except that receptacle outlets installed in accordance with paragraph (b) of this section may be of a type that will accommodate both grounding and nongrounding plugs.

(d) Receptacle outlets for use in damp or wet locations shall be so designed that, when the plug is in place, the plug will be held in positive contact and will establish and maintain a watertight integrity of the enclosure.

(e) Receptacle outlets for use in damp or wet locations shall be so designed that, when the plug is not in place, the plug opening may be closed to establish and maintain a watertight integrity of the enclosure. Where threaded caps are used for this purpose, the cap shall be mechanically fastened to the cover or enclosure by a strong link or hinged strap.

(f) Receptacle outlets for use in locations exposed to the weather shall be so designed that with the plug opening uncovered, water will not collect in the interior of the box.

(g) Receptacle outlets for use in locations where accessible to other than qualified persons shall, with the plug opening uncovered, present no live parts. Any screw, rivet, contact, or the like which is accessible and in electrical connection with any live-metal part shall be located in a hole not more than 9/32 inch in diameter and recessed not less than 3/16 inch in the clear.

(h) When it is necessary to transmit current in one direction between 2 receptacle outlets by means of a portable cable with a plug on each end (such as a battery charging lead between a receptacle outlet on a ship and a receptacle outlet in a lifeboat), the plug which may be energized when not inserted in the receptacle outlet, shall be of the female type and shall comply with the requirements of paragraph (g) of this section.

(i) A receptacle outlet installed on a lifeboat for the purpose of connecting it to the ship's electrical system shall be of a type that will permit the plug to pull free should the lifeboat be lowered.

(j) Where receptacle outlets on a ship are connected to different potentials, or to different types of potentials, receptacle outlet types shall be selected so that a portable device cannot be plugged into a receptacle outlet of an unsuitable potential.

(k) Receptacle outlets and plugs for use in damp or wet locations shall be constructed of corrosion-resistant material(s), or of a material(s) with a corrosion-resistant finish(es), except that receptacle outlets and plugs for use in corrosive locations shall be constructed of corrosion-resistant material(s).

(l) Receptacle outlets and plugs when installed and wired shall have a minimum spacing between live parts and ground of ¼ inch through air or over surface for potentials of 250 volts or less.

(m) Interior units of receptacle outlets and plugs shall conform to the requirements of Underwriters' Laboratories, Inc. Standard for Attachment Plugs and Receptacles.

§ 111.60–35 *Lighting fixtures*—(a) *General requirements.* (1) Fixtures shall have no live parts normally exposed to contact.

(2) Pull chain type switched lampholders shall not be used.

(3) Incandescent lamps shall be of the medium base type, except that special base lamps may be used for special applications when approved.

(4) Arc lamps shall not be used for applications other than for searchlights and for motion picture projectors.

(5) Unspecified construction details shall be in accordance with Underwriters' Laboratories, Inc. Standard for Electric Lighting Fixtures and Portable Lamps.

(b) *Lighting fixture applications.* (1) Fixtures installed in damp or wet locations shall be of watertight construction.

(2) Fixtures shall be constructed of corrosion-resistant material(s) or of a material(s) with a corrosion-resistant finish(es), except that fixtures in corrosive locations shall be constructed of corrosion-resistant material(s).

(3) Fixtures shall be so constructed, or installed, or equipped with shades and/or guards that combustible material will not be subjected to temperatures in excess of 90 degrees C.

(4) Fixture globes shall be protected by guards except in living quarters, wheelhouse, gyro room, radio room, galley, and similar spaces where not subject to mechanical damage.

(c) *Provisions at fixture outlet boxes, canopies and pans.* (1) Canopies and outlet boxes taken together shall provide adequate space so that fixture conductors and their connecting devices may be properly installed.

(2) Fixtures shall be of such construction or so installed that the conductors in outlet boxes will not be subjected to temperatures greater than that for which the conductors are approved (75 degrees C. for rubber insulated conductors, 85 degrees C. for varnished-cambric insulated conductors, and 95 degrees C. for asbestos-varnished-cambric insulated conductors).

(3) In a completed installation, each outlet box shall be provided with a cover unless it is covered by means of a fixture canopy, lampholder, or similar device.

(4) Any combustible bulkhead or ceiling finish exposed between the edge of a fixture canopy or pan and the outlet box shall be covered with noncombustible material.

(d) *Fixture supports.* (1) Fixtures, lampholders and receptacle outlets shall be securely supported. Fixtures shall not be supported by the screw shell of a lampholder.

(2) Pendent fixtures shall be suspended by, and supplied through threaded rigid conduit stems.

(3) Table lamps, desk lamps, floor lamps, and similar equipment shall be secured in place to prevent displacement by the roll or pitch of the vessel.

(e) *Wiring of fixtures.* (1) Wiring on or within fixtures shall be neatly arranged and not exposed to mechanical injury. Excess wiring shall be avoided. Conductors shall be so arranged that they will not be subjected to temperatures above those for which they are approved.

(2) Fixture conductors shall not be smaller than No. 18 AWG.

(3) Fixtures shall be wired with conductors having insulation suitable for the current, voltage, and temperature to which the conductors will be subjected.

(4) Fixtures provided with mogul base screw-shell lampholders shall be wired with Type AF fixture wire. Fixtures provided with other than mogul base screw-shell lampholders shall be wired with Type AF fixture wire, except that Type CF fixture wire may be used where temperatures do not exceed 90 degrees C. type RFH–2 or FFH–2 fixture wire may be used where temperatures do not exceed 75 degrees C., Type TF, TFF, RF–2, or FF–2 fixture wire may be used where the temperatures do not exceed 60 degrees C.

(5) Conductors shall be secured in a manner that will not tend to cut or abrade the insulation. Conductors shall be protected from abrasion where they pass through metal.

(6) Fixtures shall be so installed that the connections between the fixture conductors and the circuit conductors may be inspected without requiring the disconnection of any part of the wiring. Splices and taps shall not be located within fixture arms or stems. No unnecessary splices or taps shall be made within or on a fixture.

(7) Fixtures shall not be used as connection boxes for circuits other than the branch circuit supplying the fixture except that two or more circuits may supply the fixture when (i) one or more lamps of a multi-lamp fixture are supplied from an emergency lighting circuit; or (ii) when the number of lamps of a fixture exceeds the capacity of a single circuit. When more than one cir-

cuit is employed in a fixture, the circuits shall be as widely separated as possible and the different circuits clearly identified at terminal points. Also see § 111.50–20 (c) (5).

(8) Fixtures shall be so wired that the screw-shells of lampholders will be connected to the same fixture or circuit conductor or terminal. Fixtures supplied by a dual-voltage system having a grounded neutral shall have the screw-shells of lampholders connected to the identified grounded neutral conductor.

(9) For wiring of explosion-proof equipment see § 111.60–40.

(f) *Lampholders.* (1) Porcelain shall not be used for lampholders where the material is rigidly fastened by machine screws or the equivalent.

(2) There shall be a spacing through air or over surfaces of not less than ¼ inch between uninsulated live metal parts and a dead metal part which is liable to be grounded or exposed to contact by persons when the device is installed or maintained in the intended manner.

(3) When lampholders are attached to a cap, hickey, or strap, two machine screws shall be employed to secure the lampholder body.

(4) Edison-base (medium base) lampholders shall be constructed in accordance with Underwriters' Laboratories, Inc. Standard for Edison-Base Lampholders and shall be labeled, except as otherwise specified in this subpart.

(g) *Special provisions for electric-discharge-lamp fixtures.* (1) The lamps of electric-discharge-lamp fixtures shall be protected from damage and drop-out, such as by means of louvers, hinged doors, inverted ceiling troughs, or the equivalent.

(2) Electric discharge lamps designed for an open-circuit voltage in excess of 700 volts shall not be used.

(3) Electric-discharge-lamp fixtures having an open-circuit voltage in excess of 120 volts shall have a clearly legible marking in letters not less than ¼ inch high reading "CAUTION __ VOLTS." The voltage indicated shall be rated open-circuit voltage.

(4) Fixtures shall be installed on alternating-current circuits only, unless the fixtures are equipped with auxiliary equipment and resistors especially designed for direct-current operation and the fixtures are so marked.

(5) An auto-transformer which is used as part of a ballast for supplying lighting units and which raises the voltage to more than 300 volts shall be supplied only by a grounded system.

(6) Fluorescent lamps shall be provided with supplementary supporting clamps or other means to prevent loose contact or drop-out due to vibration.

(7) Auxiliary equipment for use with electric discharge type lamps shall be of a type conforming to Underwriters' Laboratories, Inc. Standard for Electric-Discharge-Lamp Accessory Equipment, and shall be so labeled.

(h) *Grounding of lighting equipment.* (1) Lighting equipment (including fixtures) shall be grounded.

(2) Equipment shall be considered as grounded when mechanically connected in a permanent and effective manner to the metal structure of the ship, the armor of armored cable, or a grounding conductor.

§ 111.60–40 *Wiring methods and material for hazardous location*—(a) *General.* (1) The provisions of this section apply to locations in which equipment and wiring are subjected to the conditions indicated by the classifications covered by subparagraphs (6) through (8) of this paragraph. It is necessary that each compartment or area containing electrical equipment be considered individually in order to determine its hazard classifications. Except as modified by this section, all other applicable rules contained in this subchapter shall apply to electrical equipment and wiring installed in hazardous locations.

(2) The term "explosion-proof" as used in this section shall mean enclosed in a case which is capable of withstanding an explosion of a specified gas or vapor which may occur within it, and of preventing the ignition of the specified gas or vapor surrounding the enclosure by sparks, flashes or explosions of the gas or vapor within.

(3) Through the exercise of ingenuity in the layout of electrical installations for hazardous locations, it is frequently possible to locate much of the equipment in less hazardous or nonhazardous areas and thus reduce the amount of special equipment required. The amount of electrical equipment or wiring in hazardous locations shall be minimized.

(4) The intent of this section is to require a form of construction of equipment, and of installation that will insure safe performance under conditions of proper use and maintenance. It is necessary, therefore, that more than ordinary care be exercised with regard to the installation and maintenance of equipment and wiring in hazardous areas.

(5) The explosive characteristics of various atmospheric mixtures of hazardous gases, vapors and dusts depend on the specific hazardous material involved. It is necessary, therefore, that equipment be designed not only for the class of location but also for the specific gas, vapor or dust that will be present. For the purpose of approval, the following atmospheric mixtures have been grouped on the basis of their explosive characteristics:

Group A: Atmospheres containing acetylene;
Group B: Atmospheres containing hydrogen, or gases or vapors of equivalent hazard, such as manufactured gas;
Group C: Atmospheres containing ethyl ether vapor;
Group D: Atmospheres containing gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors, and natural gas;
Group E: Atmospheres containing metal dust;
Group F: Atmospheres containing carbon black, coal or coke dust; and
Group G: Atmospheres containing grain dust.

(6) Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitible mixtures.

(i) This classification would usually include locations such as cargo pump rooms, cofferdam areas, and in some cases open deck areas, storage and mixing rooms for paint and allied products, storage rooms for oil, oil lamps and the like, battery rooms, and hospital operating rooms in which combustible anesthetics may be administered.

(7) Class II locations are those in which combustible dust is or may be in the air continuously, intermittently, or periodically under normal conditions, in quantities sufficient to produce explosive or ignitible mixtures.

(i) This classification would usually include the working areas handling bulk grain and similar products, coal pulverizing plants (except where the pulverizing equipment is essentially dust-tight), and the like.

(8) Class III locations are those in which easily ignitible fibers or materials producing combustible flyings are handled or used.

(i) Easily ignitible fibers and combustible flyings will include rayon, cotton (including cotton linters and cotton waste), sisal or henequen, istle, jute, hemp, tow, cocoa fiber, oakum, baled waste, kapok, Spanish moss, excelsior, sawdust, and other materials of similar nature.

(ii) Class III locations will usually include areas where the above products are handled in bulk, carpenter shop and similar locations.

(b) *Electrical installations in Class I, Groups A, B, C, and D, hazardous locations*—(1) *Meters, instruments and relays.* Meters, instruments, and relays, including kilowatt-hour meters, instrument transformers and resistors, rectifiers and thermionic tubes, shall be provided with explosion-proof enclosures approved for Class I locations.

(2) *Switches, circuit breakers, motor controllers and fuses.* Switches, circuit breakers, motor controllers and fuses, including pushbuttons, relays and similar devices, shall be provided with enclosures, and the enclosures in each case together with the enclosed equipment shall be approved as a complete assembly for use in Class I locations.

(3) *Control transformers and resistors.* Transformers, impedance coils and resistors used as, or in conjunction with, control equipment for motors, generators and appliances, together with any switching mechanism associated with them, shall be provided with explosion-proof enclosures approved for Class I locations.

(4) *Motors and generators.* Motors, generators and other rotating electrical machinery shall be of enclosed explosion-proof type approved for Class I locations.

(5) *Lighting fixtures.* Each lighting fixture shall be approved as a complete assembly for class I locations, and shall be clearly marked to indicate the maximum wattage of lamps for which it is approved. Fixtures intended for portable use shall be specifically approved as a complete assembly for that use.

(i) *Mechanical injury.* Each fixture shall be protected against mechanical injury by a suitable guard. Pendent fixtures having rigid conduit stems

longer than 12 inches shall have permanent and effective bracing against lateral displacement.

(ii) *Support.* Boxes, box assemblies or fittings used for the support of lighting fixtures shall be approved for the purpose and for Class I location.

(6) *Appliances, fixed and portable.* Appliances, including electrically heated and motor-driven appliances, shall be approved for Class I locations.

(7) *Flexible cords.* A flexible cord may be used only for connections between a portable lamp or a portable appliance and the fixed portion of its supply circuit and where used shall be of a type approved for extra hard usage; contain, in addition to the conductors of the circuit, a grounding conductor; be connected to terminals or to supply conductors in an approved manner; be supported by clamps or by other suitable means in such a manner that there will be no tension on the terminal connections; and be provided with suitable seals where the flexible cord enters boxes, fittings, or enclosures of explosion-proof type.

(i) Where flexible cords may be exposed to liquids having a deleterious effect on rubber, they shall be of a type approved for use under such conditions.

(8) *Receptacle outlets and attachment plugs.* Receptacle outlets and attachment plugs shall be of the polarized type providing for connection to the grounding conductor of the flexible cord and shall be approved for Class I locations.

(9) *Signal, alarm, remote-control and communication systems.* Signal, alarm, remote-control and communication systems, irrespective of voltage, shall be approved for Class I locations.

(10) *Wiring methods.* (i) Electric cables shall be leaded and armored or impervious sheathed and armored.

(ii) The cable entrance to each explosion-proof device shall be sealed to prevent the passage of gases, vapors, or flames from within the explosion-proof enclosure.

(iii) The seal fitting shall be located as close as practicable to, but in no case more than 18 inches from, the enclosure, and shall be connected thereto by means of a short length of rigid metal conduit with threaded explosion-proof joints each having at least 5 full threads engaged.

(iv) All cable covering except the individual conductor insulation shall be removed in way of the seal fitting, and the seal fitting filled with a sealing compound.

(v) The sealing compound shall be approved for the purpose, shall not be affected by the surrounding atmosphere or liquids, and shall not have a melting point of less than 93 degrees C.

(vi) In the completed seal, the minimum thickness of the sealing compound shall be not less than the trade size of the conduit, and in no case less than $\frac{5}{8}$ of an inch.

(vii) Splices and taps shall not be located in the seal-fitting, nor shall other fittings in which splices or taps are made be filled with compound.

(c) *Electrical installations in Class II hazardous locations*—(1) *Switches, circuit breakers, motor controllers, and fuses.* Switches, circuit breakers, motor controllers and fuses, including push-buttons, relays and similar devices, which are intended to interrupt current in the normal performance of the function for which they are installed, or which are installed where dusts of an electrically conducting nature may be present, shall be provided with dust-tight enclosures approved for Class II locations.

(i) Disconnecting and isolating switches containing no fuses and not intended to interrupt current, and which are not installed where dust may be of an electrically conducting nature, shall be provided with tight metal enclosures which shall be equipped with close fitting covers, or with other effective means to prevent the escape of sparks or burning material; and have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape, or through which exterior accumulations of dust or adjacent combustible material might be ignited.

(2) *Control transformers and resistors.* Transformers, impedance coils and resistors used as, or in conjunction with, control equipment for motors, generators and appliances, and any overcurrent devices or switching mechanisms associated with them, shall have dust-tight enclosures approved for Class II locations.

(3) *Motors and generators.* Motors, generators and other rotating electrical machinery shall be totally enclosed not ventilated, totally enclosed pipe ventilated, or totally enclosed fan-cooled, and shall be approved for Class II locations.

(4) *Appliances, fixed and portable.* Appliances, fixed and portable, including electrically heated and motor-driven appliances, shall be approved for Class II locations.

(5) *Lighting fixtures.* Each lighting fixture, fixed or portable, shall be approved for Class II locations, and shall be clearly marked to indicate the maximum wattage of the lamp for which it is approved. Each fixture shall be protected against mechanical injury by a suitable guard. Pendent fixtures having rigid conduit stems longer than 12 inches shall have permanent and effective bracing against lateral displacement. Boxes, box assemblies or fittings used for the support of lighting fixtures shall be approved for the purpose and for Class II locations.

(6) *Receptacles and attachment plugs.* Receptacles and attachment plugs shall be polarized type providing for connection to the grounding conductor of the flexible cord, and shall be approved for Class II locations.

(7) *Signal, alarm, remote-control, and communication systems.* (i) Switches, circuit breakers, relays, contactors and fuses which may interrupt other than voice currents, and current-breaking contacts for bells, horns, howlers, sirens and other devices in which sparks or arcs may be produced, shall be provided with dust-tight enclosures approved for Class II locations.

(ii) Resistors, transformers, and choke coils which may carry other than voice currents, and rectifiers, thermionic tubes, and other heat generating equipment or apparatus shall be provided with dust-tight enclosures approved for Class II locations.

(8) *Wiring methods*—(i) *Fittings and boxes.* Fittings and boxes shall be provided with threaded bosses for terminal tubes, shall have close fitting covers, and shall have no openings (such as holes for attaching screws) through which sparks or burning material might escape. Fittings or boxes in which taps, joints or terminal connections are made, or which are used in locations where dusts are of an electrically conducting nature, shall be approved for Class II locations.

(ii) *Electric cables.* Electric cables shall be leaded and armored or impervious sheathed and armored and cable entrances made dust-tight by terminal tubes.

(iii) *Flexible connections.* Where necessary to employ flexible connections, dust-tight flexible connectors, flexible metal conduit, or flexible cord approved for extra hard usage and provided with bushed fittings shall be used, except that where dusts are of an electrically-conducting nature, flexible metal conduit shall not be used, and flexible cords shall be provided with dust seals at both ends. Where flexible cords are subject to oil or other corrosive conditions, the conductors shall be of a type approved for the condition. An additional conductor for grounding shall be provided in the flexible cord.

(d) *Electrical installations in Class III hazardous locations*—(1) *Switches circuit breakers, motor controllers and fuses.* Switches, circuit breakers, motor controllers, and fuses, including push buttons, relays, and similar devices, shall be provided with tight metal enclosures which shall be equipped with close fitting covers, or with other effective means to prevent escape of sparks or burning material; and have no openings (such as holes for attachment screws) through which after installation, sparks or burning material might escape, or through which exterior accumulations of fibers or flyings or adjacent combustible material might be ignited.

(2) *Control transformers and resistors.* Transformers, impedance coils and resistors used as, or in conjunction with, control equipment for motors, generators and appliances, shall conform to paragraph (c) (2) of this section.

(3) *Motors and generators.* Motors, generators, and other rotating electrical machinery shall be totally enclosed not ventilated, totally enclosed pipe-ventilated, or totally-enclosed fan-cooled.

(4) *Applicances, fixed and portable.* Appliances, fixed and portable, shall conform to the requirements of this subparagraph.

(i) *Heaters.* Electrically heated appliances shall be provided with dust-tight enclosures and shall be approved for Class III locations.

(ii) *Motors.* Motors of motor-driven appliances shall conform to subparagraph (3) of this paragraph. Appliances which may be readily moved from one location to another shall conform to requirements for the most hazardous location.

(iii) *Switches, circuit breakers, motor controllers and fuses.* Switches, circuit

breakers, motor controllers and fuses shall conform to paragraph (c) (1) of this section.

(5) *Lighting fixtures.* Lighting fixtures shall conform to the requirements of this subparagraph.

(i) *Construction.* Each fixture shall be of dust-tight type so designed that in the event of burnout of lamp or lampholder, no spark or hot metal can escape from the fixture. Unless each fixture is so constructed that it will not accept a lamp of larger wattage than that for which it is designed, it shall be clearly marked to indicate the maximum wattage of lamp that should be used.

(ii) *Mechanical injury.* A fixture which may be exposed to mechanical injury shall be protected by a suitable guard.

(iii) *Supports.* Boxes, box assemblies or fittings used for the support of lighting fixtures shall be of a type approved for the purpose.

(iv) *Portable lamps.* Portable lamps shall be dust-tight and shall be protected with substantial guards. Lampholders shall be of unswitched type with no exposed metal parts. Unless the portable lamp is so constructed that it will not accept a lamp of larger wattage than that for which it is designed, it shall be clearly marked to indicate the maximum wattage of lamp that should be used.

(6) *Receptacles and attachment plugs.* Receptacles and attachment plugs shall conform to paragraph (c) (6) of this section.

(7) *Signals, alarm, remote control and communication systems.* Signal, alarm, remote-control and communication systems shall conform to paragraph (c) (7) of this section.

(8) *Wiring methods.* (i) Fittings and boxes in which taps, joints, or terminal connections are made shall be provided with close fitting covers, or other effective means, to prevent the escape of sparks or burning material; and, have no openings (such as holes for attaching screws) through which, after installation, sparks or burning material might escape, or through which exterior accumulations of fibers or flyings or adjacent combustible materials might be ignited.

(ii) Electric cables shall conform to paragraph (c) (8) (ii) of this section.

(iii) Flexible connections shall conform to paragraph (c) (8) (iii) of this section.

SUBPART 111.65—SPECIAL REQUIREMENTS FOR CERTAIN LOCATIONS AND SYSTEMS

§ 111.65–1 *Application.* The requirements of this subpart contain special requirements relative to electrical installations in specific areas and to specific electrical systems. Except as modified by this subpart, all other applicable rules contained in this subchapter shall also apply to such installations and systems.

§ 111.65–5 *Special requirements for hospital operating rooms*—(a) *Application.* The requirements of this section are applicable to any area of a hospital in which it is intended to administer to a patient any combustible anesthetic agent in the course of examination or treatment, and to any room used for storage of combustible anesthetic or disinfecting agents.

(b) *General requirements.* The electrical installations and electrical equipment in anesthetizing locations and in storage locations for combustible anesthetic or disinfecting agents shall comply with Recommended Safe Practice for Hospital Operating Rooms, published by National Fire Protection Association. The requirements of "Class I, Group C, Division 1 locations of Article 500 of the National Electrical Code" as referred to in Recommended Safe Practice for Hospital Operating Rooms shall be construed to mean the requirements for "Class I, Group C locations covered in § 111.60–40 (b)."

§ 111.65–10 *Special requirements for locations where gasoline or other highly volatile motor fuel is carried in vehicles*—(a) *Application.* The provisions of this section are applicable to any area in which gasoline or other highly volatile motor fuel is stored in self-propelled vehicles being transported.

(b) *General requirements.* Electrical equipment which tends to produce arcs or sparks, such as cutouts, switches, receptacles, lampholders, generators, motors, or other equipment having make or break or sliding contacts, when installed within 4 feet of the deck, shall be of a type approved for Class I, Group D locations in accordance with § 111.60–40 (b).

(1) The reference to a level of 4 feet above the deck shall be construed to mean each deck at or above the weather deck on which vehicles are transported.

(2) Areas below the weather deck on which vehicles are transported shall be deemed to be a hazardous area to a height 4 feet above the weather deck.

§ 111.65–15 *Special requirements for motion picture projection rooms and projection equipment*—(a) *General*—(1) *Professional type projectors.* The professional type of projectors shall be located in a projector room. Such rooms shall not be considered as a hazardous location as defined in § 111.60–40. (The professional projector employs a 35-millimeter film which is 1⅜ inches wide and has on each edge 5.4 perforations per inch.)

(2) *Non-professional type projectors.* Projectors of the non-professional or miniature type, if employing only approved slow-burning (cellulose acetate or equivalent) film, may be operated without a projection room.

(b) *Equipment and projectors of the professional type*—(1) *Motor-driven projectors.* Motor-driven projectors shall be approved for the purpose as an assembly or shall comply with all the conditions contained in this subparagraph.

(i) An approved projector shall be used.

(ii) An approved projector lamp shall be used.

(iii) Motors shall be so designed or guarded as to prevent ignition of film by sparks or arcs.

(iv) Projectors shall be under the charge of a qualified person.

(2) *Conductor size.* Conductors supplying outlets for projectors of the professional type shall not be smaller than No. 8 AWG, and shall be of sufficient size for the projector employed.

(3) *Conductor insulation.* Conductors having a maximum operating temperature of 200 degrees C. shall be used on all lamps or other equipment when the ambient temperature at the conductors as installed will exceed 50 degrees C.

(4) *Flexible cords.* Cords approved for hard service shall be used on portable equipment.

(5) *Lamp guards.* Incandescent lamps in projector rooms shall be provided with guards unless otherwise protected by noncombustible shades or other enclosures.

(6) *Location of equipment.* Motor-generator sets, transformers, rectifiers, rheostats, and similar equipment for the supply or control of current to arc lamps on projectors shall, if practicable, be located in separate rooms. If placed in the projector room, they shall be so located or guarded that arcs or sparks cannot come in contact with film. Motor-generator sets shall have the commutator end or ends totally enclosed.

(7) *Equipment prohibited.* No switches, overcurrent devices, or other equipment, not normally required or used for projectors, sound reproduction, flood, or other special effect lamps or other equipment, shall be installed in projector rooms, except remote-control switches for control of auditorium lights.

(c) *Construction of equipment and projectors of the professional type.* (1) Projectors and enclosures for arc or incandescent lamps and associated equipment shall be of a type, listed as approved by Underwriters' Laboratories, Inc.

§ 111.65–20 *Special requirements for electric elevators and dumbwaiters*—(a) *Application.* The requirements of this section are applicable to electric elevators and dumbwaiters and are in addition to the general requirements contained in this subchapter.

(b) *General requirements.* The electrical control and interlock circuits of elevators and dumbwaiters shall be in accordance with American Standards Association Safety Code for Elevators, Dumbwaiters, and Escalators. The construction of control switches shall conform with the requirements of Underwriters' Laboratories, Inc. Standard for Elevator Electric Contacts and Elevator Hoistway Door Interlocks.

§ 111.65–25 *Special requirements for submersible motor-driven bilge pumps*—(a) *Application.* The requirements of this section are applicable to submersible motor-driven bilge pumps required on certain vessels by Subpart 55.10 of Subchapter F (Marine Engineering) of this chapter.

(b) *General requirements.* (1) The electric motor driving the submersible bilge pump shall be installed in an open end air bell of rugged construction and of such proportions that flooding of the compartment, in which it is located, to the bulkhead deck will not cause water to enter the motor.

(2) The motor may be of the open type provided it is protected against splashing water from the bottom.

(3) Cables to the motor shall enter through the open bottom of the air bell.

(4) The motor shall be capable of continuous operation at rated load under any condition, dry or with water in air bell at any level up to maximum.

(5) The motor controller shall be located above the bulkhead deck with a master switch at the controller and a master switch at the motor. The master switch at the motor shall be connected in such a manner that it will be completely disconnected from the circuit when the motor is started or stopped from the remote master switch.

(6) The motor shall be energized from the final source of emergency lighting and power.

§ 111.65–30 *Special requirements for electric power-operated watertight door system*—(a) *Application.* The provisions of this section are applicable to electric power-operated watertight door systems required by Subpart 73.35 of Subchapter H (Passenger Vessels) of this chapter, except that only paragraph (g) of this section shall be applicable to installations contracted for prior to November 19, 1952.

(b) *General requirements.* The watertight door operating system shall comply with the specification requirements of Subpart 163.001 of Subchapter Q (Specifications) of this chapter.

(c) *Power supply.* The power supply to power operated watertight door systems shall comply with the requirements contained in this paragraph.

(1) The source of power for electric motor-driven door operators shall be the source of the emergency lighting and power system as required by Subpart 112.15 of this chapter.

(2) If the peak current resulting from the simultaneous starting of all doors is too great for the temporary or final source of supply, the control shall be so arranged that when the central master switch is put to "close" the doors will start to close serially at intervals of not more than 3 seconds, preference being given to the doors in the lowest part of the vessel.

(3) The power supply for hydraulically operated watertight door systems employing a hydraulic system common to more than one watertight door shall be an accumulator tank of sufficient capacity to open all doors twice and to close all doors three times and one or more motor-driven hydraulic pumps capable of being operated from the final source of the emergency lighting and power system.

(i) The motor-driven hydraulic pumps automatically shall maintain the accumulator tank pressure within the design limits, and shall be located and controlled from above the bulkhead deck.

(ii) The accumulator tank capacity required by subdivision (i) of this subparagraph shall be available when the accumulator tank pressure is at the automatic pump "cut-in" pressure.

(4) The source of power for hydraulically operated watertight door systems employing an independent hydraulic system for each door operator shall be as required by subparagraphs (1) and (2) of this paragraph.

(5) The power supply for other types of watertight door operators shall be as approved by the Commandant.

(d) *Distribution.* Distribution of electric power to the watertight door operators shall comply with the requirements covered in this paragraph.

(1) Distribution panelboards used in connection with watertight door systems shall be located above the bulkhead deck and shall be provided with means for locking to prevent unauthorized access to the switching devices or fuses.

(2) Feeders supplying several watertight door operators shall be located above the bulkhead deck.

(3) A separate branch circuit shall be provided for each watertight door operator.

(e) *Overcurrent protection.* Overcurrent devices employed in watertight door system feeders and branch circuits shall be arranged to isolate a fault with as little disruption of the system as possible. The relationship between loads and rating or setting of overcurrent devices shall conform to the requirements covered in this paragraph.

(1) The rating or setting of each feeder overcurrent device shall be not less than 200 percent of its maximum load.

(2) The rating or setting of a branch circuit overcurrent device shall be not more than 25 percent of that of the feeder overcurrent device.

(f) *Cable.* All cable used in connection with watertight door system feeder circuits or branch circuits shall be leaded and armored or impervious sheathed and armored.

(g) *Existing vessels.* (1) Existing arrangements, materials, and facilities previously approved but not meeting the applicable specifications or requirements set forth in paragraphs (b) through (f) of this section may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation provided that in no case will a greater departure from the standards of paragraphs (b) through (f) of this section be permitted than presently exist.

(2) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

§ 111.65–35 *Special requirements for fire screen door holding and release systems*—(a) *Application.* When an electric fire screen door holding and release system is installed in compliance with the requirements of Part 72 of Subchapter H (Passenger Vessels) of this chapter, the provisions of this section, with the exception of paragraph (e) of this section shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of paragraph (e) of this section.

(b) *Definitions.* The term "fire screen door" will be used in this section to designate any self-closing door required to comply with § 72.05–25 (b) of Subchapter H (Passenger Vessels) of this chapter.

(2) The term "fire screen holding device" will be used in this section to designate any device designed and installed for the purpose of holding open a fire screen door.

(3) The term "local control station" will be used in this section to designate any manually operated device installed adjacent to a fire screen door for the purpose of releasing the door so that the fire screen door self-closing mechanism may close the door.

(4) The term "central control station" will be used in this subpart to designate any manually operated device installed to release the fire screen doors from the wheelhouse or fire control room.

(c) *General.* (1) The fire screen door holding and release system requirements contained in this section presuppose that the fire screen doors will be held open by electromagnets, door release being effected by deenergizing the electromagnets.

(2) The Commandant may accept any other means for fire screen door holding and releasing not less effective than the electromagnetic type covered by this subpart.

(d) *General requirements.* (1) The fire screen door holding and release system shall consist of an electromagnet for each fire screen door, a self-aligning armature plate on each door to be seized and held by the electromagnet when the fire screen door is fully open, a control switch located adjacent to the door to interrupt the supply potential to the electromagnet, and a central control located in the wheelhouse or fire control room to interrupt remotely potential to all holding magnets.

(2) The fire screen door holding circuit shall be arranged so that loss of potential from any cause will release the doors, except that momentary interruptions of the circuit that may result from the operation of automatic bus-transfer devices in connection with the emergency lighting and power system, will not release the doors.

(3) The central control station shall consist of an enclosed switch, circuit breaker, or magnetic contactor of ample rating to interrupt the connected load. The switching unit shall be externally operative and maintaining in both the "hold doors" and "release doors" positions.

(4) The local control station shall consist of an enclosed externally operative fused switch having a rating of not less than 10–T amperes, 125 volts, and may be either the momentary contact type or the maintaining contact type. A single door holding magnet shall be connected to the fuse end of this local control station. Where several doors are in close proximity to each other, a single local control station switch of ample rating may be used to release these several doors simultaneously.

(5) A door holding electromagnet shall be designed for a nominal pull of approximately 200 pounds. When the

arrangement of the electrical supply involves transfer relays to transfer the supply from a final to a temporary source, a door holding electromagnet shall be designed so that, with a pull on the armature of 110 pounds, the armature will be held in the sealed position for approximately ¼ second after the circuit to the electromagnet is opened. The electromagnet shall be designed for continuous duty in an ambient temperature of 50 degrees C. with a temperature rise by thermometer measurement of not more than 55 degrees C. for Class A insulation nor more than 75 degrees C. for Class B insulation. The electromagnet coil shall be vacuum impregnated and the magnet enclosure shall be either drip-proof or watertight.

(6) The source of power for the fire screen door holding and release system shall be the emergency lighting and power system as required by Subpart 112.15 of this subchapter.

(7) On large vessels where the closing of all fire screen doors simultaneously would seriously interfere with fire-fighting operations or with the evacuation of passengers, it is recommended that the fire screen door release system be subdivided into several circuits. The circuits shall be arranged so that it will be possible to isolate any compartment in which a fire is reported by a sufficient number of closed fire screen doors effectively to stop all draft to the fire area. An effective draft stop will entail closing:

(i) All fire screen doors in the area between the main vertical zone bulkheads immediately forward and aft of the fire area;

(ii) All fire screen doors in the main vertical zone bulkheads immediately forward and aft of the fire area; and,

(iii) All fire screen doors in the next adjacent main vertical zones, forward and aft of the fire area. The fire screen door tripping arrangement shall be specifically approved for each vessel.

(e) *Existing vessels.* Fire screen door holding and release systems on vessels contracted for prior to November 19, 1952, shall meet the requirements covered in this paragraph.

(1) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(2) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

§ 111.65–40 *Special requirements of electric power-operated lifeboat winches*—(a) *Application.* The provisions of this section, with the exception of paragraph (i) of this section, shall apply to all vessels contracted for on or after November 19, 1952. The provisions of paragraph (i) of this section, shall apply to all vessels contracted for prior to November 19, 1952.

(b) *General.* The provisions of this section supplement the requirements of subpart 160.015 of Subchapter Q (Specifications) and Subpart 75.30 of Subchapter H (Passenger Vessels) and Part 94 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(c) *General construction requirements.* (1) Control and power circuit switches and motor controllers installed in conjunction with lifeboat winches shall be of types specifically approved for use with lifeboat winches.

(2) Switches and motor controllers shall be of a design not likely to be adversely affected by corrosion of the working parts. Particular attention shall be given to hinged parts of contactors and relays. Structural parts, such as the enclosing cases, if not constructed of corrosion-resistant materials, shall be given a durable corrosion-resistant finish.

(3) Insulating materials shall be limited to those which exhibit the lowest relative water absorption and/or the least effect of such water absorption upon the dielectric properties consistent with the other necessary characteristics.

(4) Where gaskets are used to provide a water seal between parts of an assembly, the gasket shall be secured in place in such a manner as to prevent its falling out or becoming loose when the unit is disassembled.

(5) Holes in the walls of equipment housings for the purpose of providing means for the attachment of parts on the interior thereof, or for securing covers and the like, shall not penetrate the total thickness of the housing wall.

(6) Totally enclosed units shall be provided with a needle valve or with at least one hole closed by a ¼ inch pipe plug for draining condensed moisture. The valve or hole shall be located at the bottom, or as near the bottom as practicable, of the enclosure in order that it may drain the enclosure satisfactorily.

(7) Main line emergency disconnect switches, when installed in a location accessible to passengers, shall be provided with means whereby the switch can be locked in the open-circuit position by means of a padlock or the equivalent. The switch shall have no provisions for locking in the closed-circuit position.

(d) *Detail construction requirements*—(1) *Enclosures.* Each enclosure for motor controller and switching devices, when installed in locations exposed to the weather, shall be capable of meeting the test requirements of paragraph (e) of this section.

(2) *Electrical clearances.* The minimum creepage and air clearance distance between live parts of different polarity of motor controllers, master switches, and control circuit limit switches shall be not less than the values shown in Table 111.65–40 (d) (2). It is desirable to exceed these values where possible. The electrical clearances for power circuit limit switches and main line emergency disconnect switches shall be not less than the general requirements for such devices given in this part.

(3) *Motors.* Motors shall be of watertight construction in accordance with the general requirements of this part.

TABLE 111.65–40 (d) (2)—MINIMUM SPACINGS IN INCHES

Potential involved in volts	0–150	151–300	301–600
Between any uninsulated live part and an uninsulated live part of opposite polarity, an uninsulated grounded part other than the enclosure, or an exposed metal part.	Through air ½	5/16	⅜
	Over surface ½	⅝	¾
Between any uninsulated live part and the walls of a metal enclosure, including fittings for cable entrance.	Through air ½	½	½
	Over surface ¾	¾	¾

(e) *Spraytight test.* (1) Before conducting this test, all joints that have gaskets or sealing compounds, or that have been painted, shall be broken and reassembled three times; this procedure also applies to doors and to cover plates. There shall be no leakage of water into the enclosure after it has been subjected to one of the following methods of submergence for a period of five continuous minutes:

(i) The enclosure shall be submerged in water to such a depth that the highest point of the enclosure in its normally mounted position is under a three-foot head; or

(ii) The enclosure shall be submerged in water at least 3 inches at the highest point in an open tank. Sufficient vacuum shall then be applied to the inside of the enclosure to produce an external pressure equivalent to a 3-foot head of water.

(2) The following additional test shall be conducted immediately after either of the above tests, and while the enclosure is still submerged. An internal air pressure shall be applied for a period of 5 minutes equal to 1½ pounds per square inch, plus a pressure equivalent to the depth of submergence.

(3) Under these tests the enclosure will be considered spraytight if no water is found inside the enclosure, and if no air bubbles are seen to emerge. Where a shaft enters the enclosure, the shaft shall be operated twice while submerged.

(4) The following formula may be used to determine the necessary vacuum:

$$M = 0.074\ (12H - W) \qquad (1)$$

where:

M = vacuum in inches of mercury,
H = equivalent head of water in feet, and
W = depth of water in inches covering the highest point of the enclosure.

(f) *Wiring of lifeboat winch components.* (1) When the motor controller of a lifeboat winch power unit is located adjacent to the winch, the main line emergency switch shall disconnect all parts of the lifeboat winch power unit, including the motor controller and limit switches, from all sources of potential. Any other power circuit switches employed shall be connected in series with the main line emergency switch and ahead of the motor controller. The main line emergency switch shall serve as the motor and controller disconnect required by the general requirements of this part, and shall have a horsepower rating not less than that of the winch motor.

(2) When the motor controller of a lifeboat winch power unit is remotely located with relation to the winch, a switch shall be provided at the controller arranged to disconnect the entire winch electrical installation from all sources of potential. In such cases, the main line emergency switch shall be connected in series with this circuit disconnect switch and ahead of the power circuit limit switches, when employed, and ahead of the motor controller.

(3) Davit arm limit switches, whether connected in the power circuit or in the control circuit, shall disconnect all ungrounded conductors of the circuit controlled.

(4) Where one motor is used with two winches, a main line emergency switch, a clutch interlock switch, and a master switch shall be provided for each winch, except that a single main line emergency switch located in accordance with subparagraph (5) of this paragraph with respect to both winches will be accepted. The main line emergency switches shall be connected in series ahead of the motor controller. The master switches shall be connected in parallel and each in series with the corresponding clutch interlock switch for that winch. The clutch interlock switches shall open the circuit to its master switch except when the power unit is clutched to the associated winch. Means shall be provided to prevent the power unit from being clutched to both winches simultaneously.

(5) Typical lifeboat winch wiring diagrams and arrangement drawings are shown on Figures 111.65–40 (f) (5) (i) through 111.65–40 (f) (5) (iv), the arrangement of the equipment shown being diagrammatical. The fact that some show direct current motors and some show alternating current motors has no particular significance. In actual installations the main line emergency disconnect switch shall be so located as to be adjacent to the master switch; within reach of the winch operator; in a position accessible to the person in charge of the boat stowage; and in a position, for gravity davit installations, from which the movement of both davit arms can be observed as they approach the final stowed position. Special consideration will be given to other arrangements where complete compliance with these location requirements cannot be met.

(g) *Procedure for approval of lifeboat winch electrical installations and equipment*—(1) *Switches.* Manufacturers of master switches, limit switches, and main line emergency disconnect switches desiring to qualify their products for use in connection with lifeboat winch installations shall submit for review detail assembly drawings of the unit, identifying each part used in the assembly and the material specification, including finish, if any, of each part. After the detail assembly drawings have been reviewed sample units may be requested for testing. Units found to comply with the requirements of this section will be listed by the Coast Guard as being satisfactory for use as lifeboat winch auxiliary equipment.

(2) *Motor controllers.* Manufacturers of motor controllers desiring to qualify their products for use in conjunction with lifeboat winch installations shall submit for review detail assembly drawings and material lists of the enclosing cases to be furnished, and detail assembly drawings and material lists and/or samples of contactors, relays, resistors and other motor controller components to be employed. For each installation of lifeboat winch motor controllers there shall be submitted for approval a drawing showing the enclosure outline, front view assembly, wiring diagram, and material list, together with the name or other identification of the vessel on which the motor controllers will be installed. No general approval of motor controllers will be given.

(3) *Motors.* For each installation of lifeboat winch motors, plans as required by § 111.05–5 shall be submitted, together with the name or other identification of the vessel on which the motor will be installed. No general approval of motors will be given.

(4) *Shipboard installation drawing.* For each shipboard installation of electric power-operated lifeboat winches, an elementary wiring diagram and isometric or deck wiring diagram as required by § 111.05–5 shall be submitted.

(h) *Testing of lifeboat winch electrical equipment.* The electrical equipment shall be given periodic inspections and tests as required by Part 78 of Subchapter H (Passenger Vessels) and Part 97 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(i) *Electric power-operated lifeboat winches for existing vessels.* (1) The electrical equipment installed in connection with electric power-operated life-

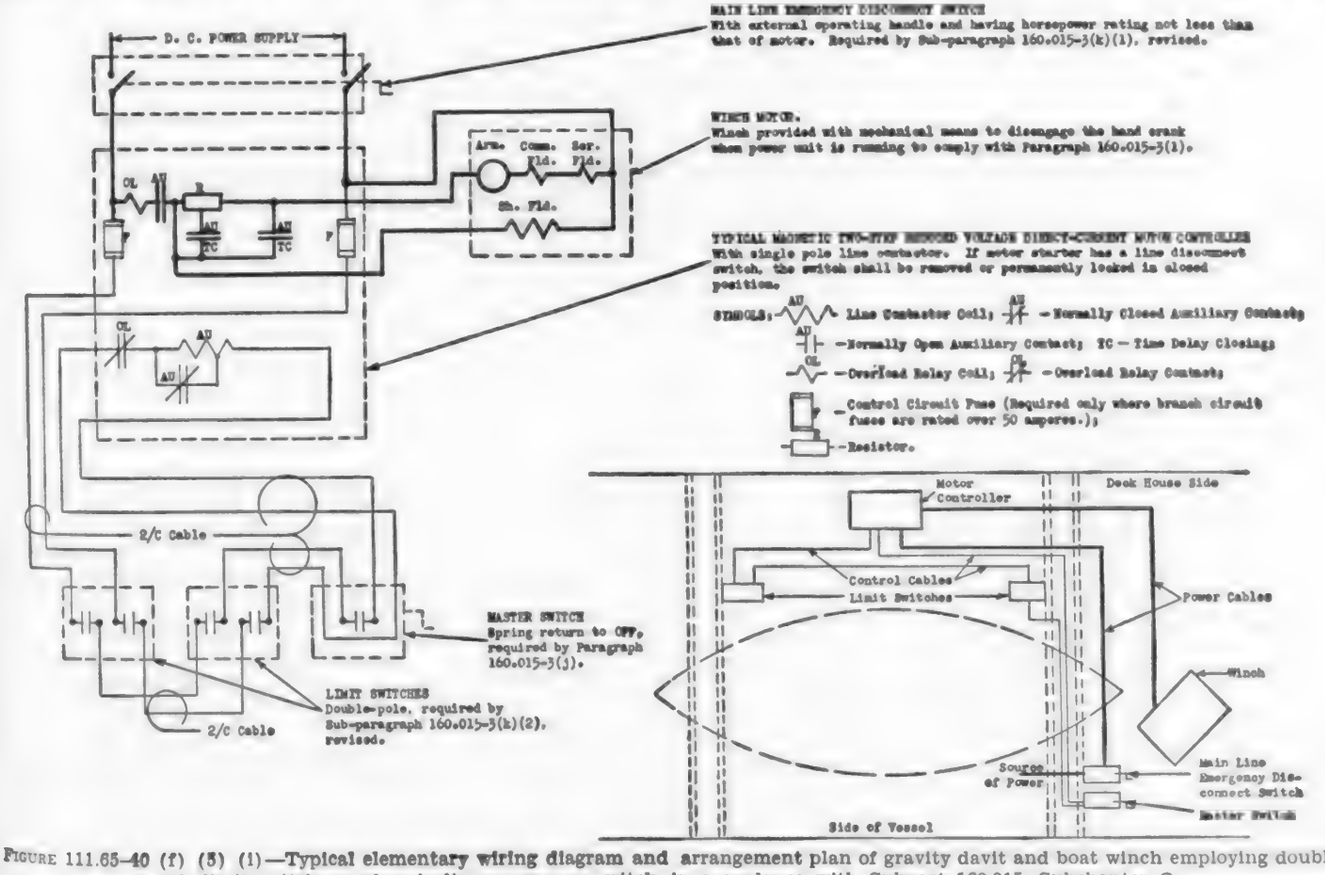

D. C. POWER SUPPLY
MAIN LINE EMERGENCY DISCONNECT SWITCH
With external operating handle and having horsepower rating not less than that of motor. Required by Sub-paragraph 160.015-3(k)(1), revised.
WINCH MOTOR.
Winch provided with mechanical means to disengage the hand crank when power unit is running to comply with Paragraph 160.015-3(1).
Arm. Comm. Ser. Fld. Fld.
Sh. Fld.
OL
AU
AU
TC
F
TYPICAL MAGNETIC TWO-WIRE REDUCED VOLTAGE DIRECT-CURRENT MOTOR CONTROLLER
With single pole line contactor. If motor starter has a line disconnect switch, the switch shall be removed or permanently locked in closed position.
SYMBOLS: AU Line Contactor Coil; AU -Normally Closed Auxiliary Contact; AU -Normally Open Auxiliary Contact; TC -Time Delay Closing; OL -Overload Relay Coil; OL -Overload Relay Contact; F -Control Circuit Fuse (Required only where branch circuit fuses are rated over 50 amperes.); -Resistor.
2/C Cable
MASTER SWITCH
Spring return to OFF, required by Paragraph 160.015-3(j).
LIMIT SWITCHES
Double-pole, required by Sub-paragraph 160.015-3(k)(2), revised.
2/C Cable
Motor Controller
Deck House Side
Control Cables
Limit Switches
Power Cables
Winch
Source of Power
Main Line Emergency Disconnect Switch
Master Switch
Side of Vessel

FIGURE 111.65–40 (f) (5) (i)—Typical elementary wiring diagram and arrangement plan of gravity davit and boat winch employing double-pole limit switches and main line emergency switch in accordance with Subpart 160.015, Subchapter Q.

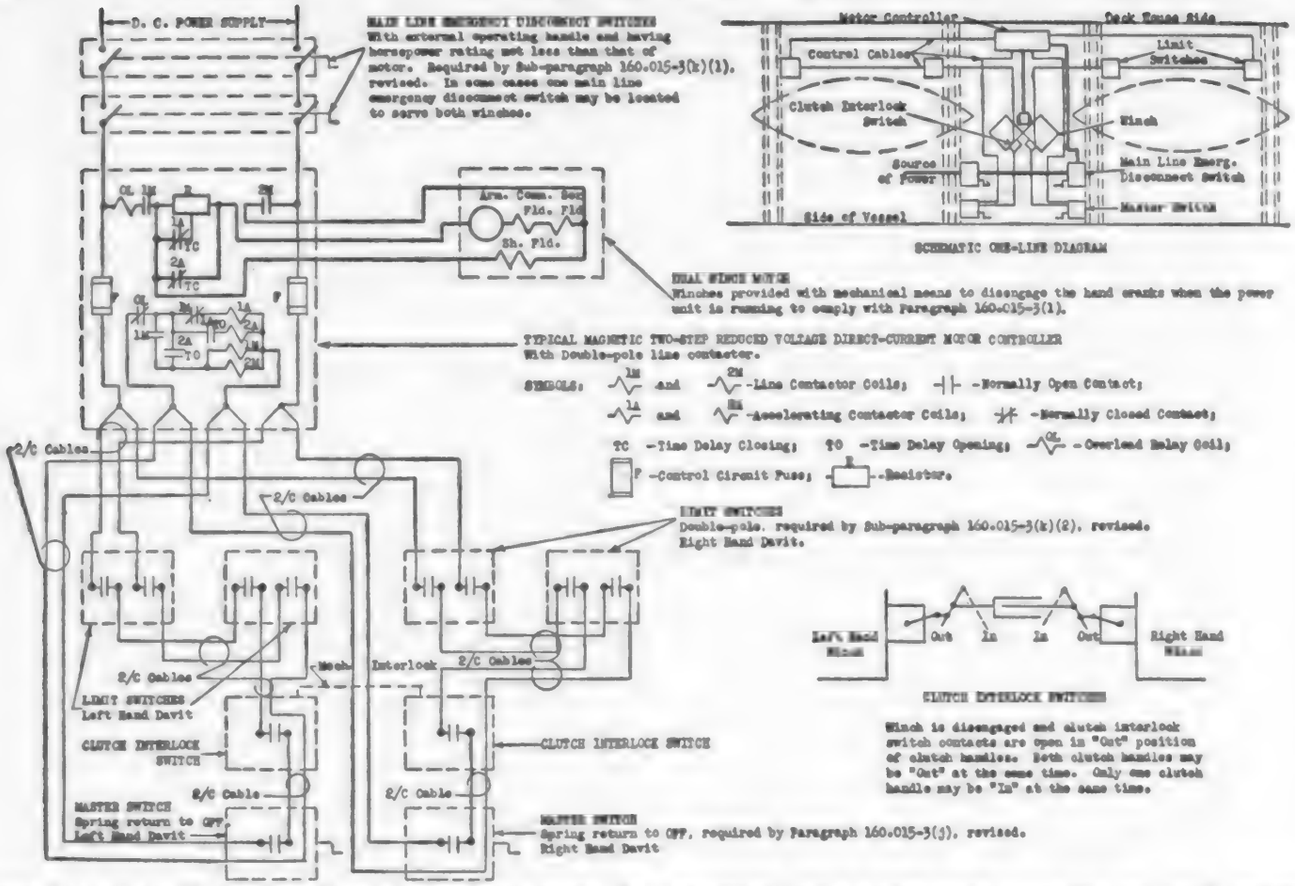

D. C. POWER SUPPLY
MAIN LINE EMERGENCY DISCONNECT SWITCHES
With external operating handle and having horsepower rating not less than that of motor. Required by Sub-paragraph 160.015-3(k)(1), revised. In some cases one main line emergency disconnect switch may be located to serve both winches.
Motor Controller
Deck House Side
Control Cables
Limit Switches
Clutch Interlock Switch
Winch
Source of Power
Main Line Emerg. Disconnect Switch
Master Switch
Side of Vessel
SCHEMATIC ONE-LINE DIAGRAM
Arm. Comm. Ser. Fld. Fld.
Sh. Fld.
DUAL WINCH MOTOR
Winches provided with mechanical means to disengage the hand cranks when the power unit is running to comply with Paragraph 160.015-3(l).
TYPICAL MAGNETIC TWO-STEP REDUCED VOLTAGE DIRECT-CURRENT MOTOR CONTROLLER
With Double-pole line contactor.
SYMBOLS: 1M and 2M -Line Contactor Coils; -Normally Open Contact;
1A and 2A -Accelerating Contactor Coils; -Normally Closed Contact;
TC -Time Delay Closing; TO -Time Delay Opening; OL -Overload Relay Coil;
F -Control Circuit Fuse; R --Resistor.
2/C Cables
LIMIT SWITCHES
Double-pole, required by Sub-paragraph 160.015-3(k)(2), revised.
Right Hand Davit.
Left Hand Winch
Out
In
In
Out
Right Hand Winch
CLUTCH INTERLOCK SWITCHES
Winch is disengaged and clutch interlock switch contacts are open in "Out" position of clutch handles. Both clutch handles may be "Out" at the same time. Only one clutch handle may be "In" at the same time.
Mech. Interlock
LIMIT SWITCHES
Left Hand Davit
CLUTCH INTERLOCK SWITCH
MASTER SWITCH
Spring return to OFF.
Left Hand Davit
MASTER SWITCH
Spring return to OFF, required by Paragraph 160.015-3(j), revised.
Right Hand Davit

FIGURE 111.65-40 (f) (5) (ii)—Typical elementary wiring diagram and arrangement plan of gravity davits and dual boat winch employing double-pole limit switches, clutch interlock switches, and main line emergency switches in accordance with Subpart 160.015, Subchapter Q.

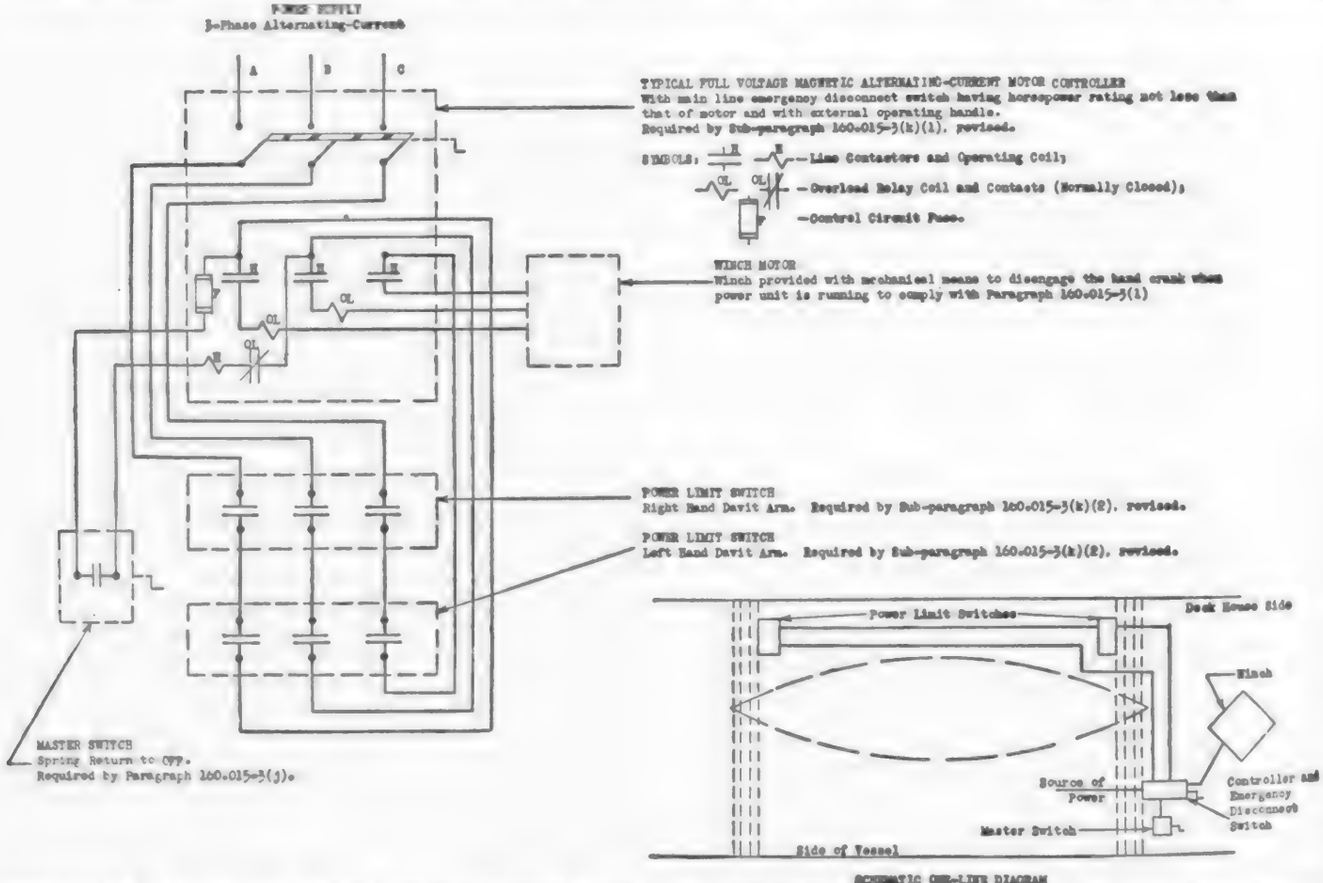

POWER SUPPLY
3-Phase Alternating-Current
A
B
C
TYPICAL FULL VOLTAGE MAGNETIC ALTERNATING-CURRENT MOTOR CONTROLLER
With main line emergency disconnect switch having horsepower rating not less than that of motor and with external operating handle.
Required by Sub-paragraph 160.015-3(k)(1), revised.
SYMBOLS: -Line Contactors and Operating Coil;
-Overload Relay Coil and Contacts (Normally Closed);
-Control Circuit Fuse.
WINCH MOTOR
Winch provided with mechanical means to disengage the hand crank when power unit is running to comply with Paragraph 160.015-3(l)
POWER LIMIT SWITCH
Right Hand Davit Arm. Required by Sub-paragraph 160.015-3(k)(2), revised.
POWER LIMIT SWITCH
Left Hand Davit Arm. Required by Sub-paragraph 160.015-3(k)(2), revised.
MASTER SWITCH
Spring Return to OFF.
Required by Paragraph 160.015-3(j).
Power Limit Switches
Deck House Side
Winch
Source of Power
Controller and Emergency Disconnect Switch
Master Switch
Side of Vessel
SCHEMATIC ONE-LINE DIAGRAM

FIGURE 111.65-40 (f) (5) (iii)—Typical elementary wiring diagram and arrangement plan of gravity davit and boat winch employing power limit switches and combined starter and main line emergency disconnect switch in accordance with Subpart 160.015, Subchapter Q.

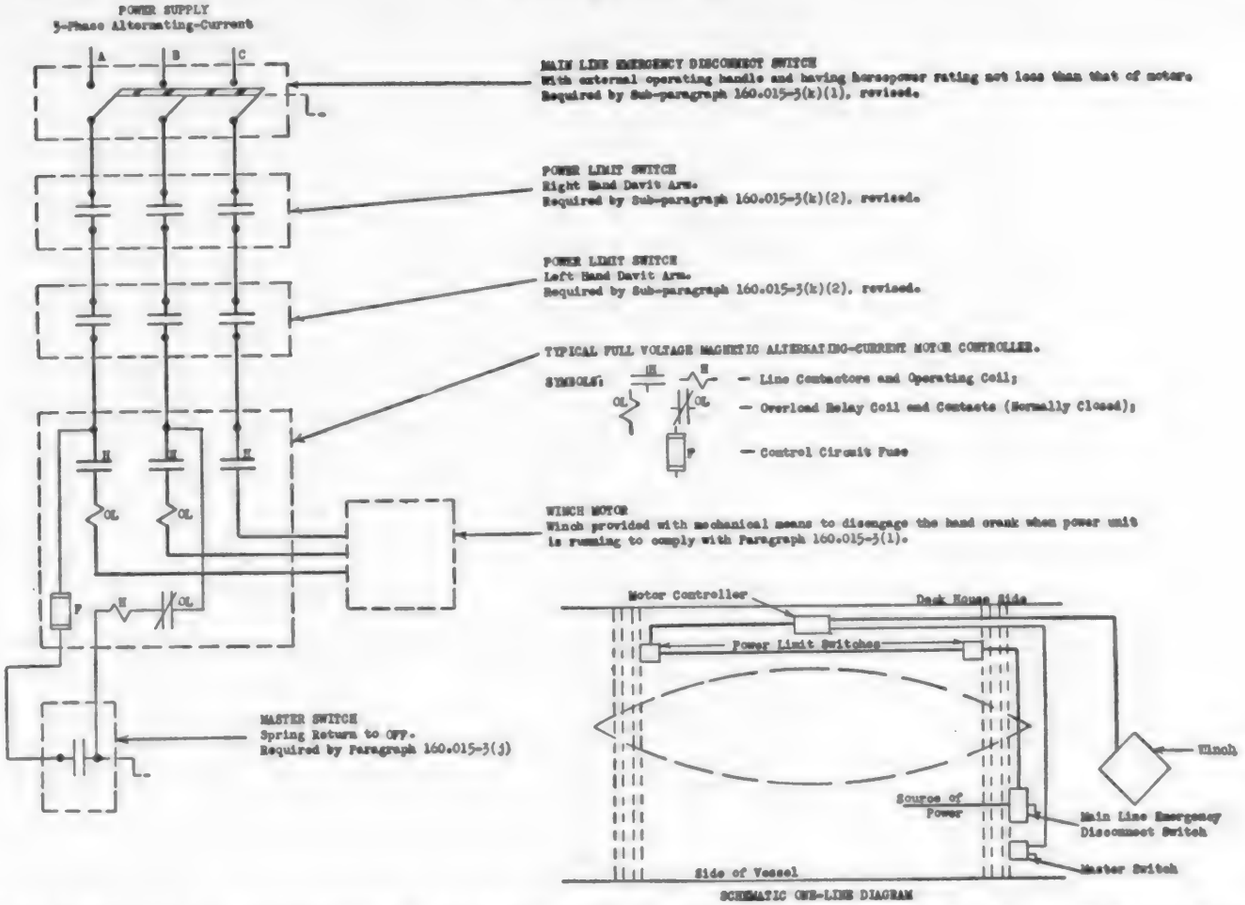

POWER SUPPLY
3-Phase Alternating-Current
A
B
C
MAIN LINE EMERGENCY DISCONNECT SWITCH
With external operating handle and having horsepower rating not less than that of motor.
Required by Sub-paragraph 160.015-3(k)(1), revised.
POWER LIMIT SWITCH
Right Hand Davit Arm.
Required by Sub-paragraph 160.015-3(k)(2), revised.
POWER LIMIT SWITCH
Left Hand Davit Arm.
Required by Sub-paragraph 160.015-3(k)(2), revised.
TYPICAL FULL VOLTAGE MAGNETIC ALTERNATING-CURRENT MOTOR CONTROLLER.
SYMBOLS:
— Line Contactors and Operating Coil;
— Overload Relay Coil and Contacts (Normally Closed);
— Control Circuit Fuse
WINCH MOTOR
Winch provided with mechanical means to disengage the hand crank when power unit is running to comply with Paragraph 160.015-3(l).
MASTER SWITCH
Spring Return to OFF.
Required by Paragraph 160.015-3(j)
Motor Controller
Dask House Side
Power Limit Switches
Winch
Source of Power
Main Line Emergency Disconnect Switch
Master Switch
Side of Vessel
SCHEMATIC ONE-LINE DIAGRAM

FIGURE 111.65-40 (f) (5) (iv)—Typical elementary wiring diagram and arrangement plan of gravity davit and boat winch employing main line emergency switch and power limit switches in accordance with Subpart 160.015, Subchapter Q.

boat winches used with gravity davits on vessels contracted for prior to November 19, 1952 shall comply with the requirements of § 160.015–3 (k) of Subpart 160.015 of Subchapter Q (Specifications) of this chapter and with the wiring arrangements of paragraph (f) of this section.

(2) New materials installed to effect compliance with this paragraph shall comply with the applicable requirements of this section. Existing materials continued in service shall comply with the requirements of this section insofar as it is reasonable and practicable.

(3) Modification of existing lifeboat winch electrical installations to effect compliance with this paragraph shall be completed not later than October 1, 1952.

(4) The electrical equipment installed in connection with electric power-operated lifeboat winches used with other than gravity davits on vessels contracted for prior to November 19, 1952, previously approved, but not meeting the applicable specifications or requirements set forth in paragraphs (b) through (f) of this section may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation: *Provided*, That, in no case, will a greater departure from the standards of paragraphs (b) through (f) of this section be permitted than presently exist. All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

§ 111.65–45 *Special requirements for electric air heaters*—(a) *Application.* The provisions of this section, with the exception of paragraph (c) of this section, shall apply to all vessels contracted for on or after November 19, 1952. The provisions of paragraph (c) of this section shall apply to all vessels contracted for prior to November 19, 1952.

(b) *General requirements.* (1) Electric heaters shall be designed for operation at a voltage not exceeding 230 volts and heaters exceeding a rating of 1,500 watts shall be designed for at least two heats.

(2) Heaters shall be designed to heat the surrounding air principally by convection. Heater elements shall be of the enclosed type. The heater element case or jacket should be of a corrosion-resistant material.

(3) Heaters shall be provided with a thermal cutout of the manually reset type that will prevent overheating and with a suitable regulating switch.

(4) Heaters for bulkhead mounting shall have their top slanted or otherwise designed to prevent hanging towels, etc., on the heater. When heaters are of the portable type, an acceptable clip or bracket shall be fitted to hold the heater in a fixed position.

(5) The external temperature of the heater enclosing case shall not exceed a temperature of 125 degrees C., except that the external temperature of the enclosing case of flush mounted heaters shall not exceed a temperature of 100 degrees C. When heaters are mounted upon, or adjacent to, the deck or bulkhead, the construction of the heater shall be such that the nearest deck or bulkhead surface will not exceed a temperature of 55 degrees C. For test purposes an ambient temperature of 25 degrees C. will be used.

(c) *Electric air heaters on vessels contracted for prior to November 19, 1952.* (1) Existing arrangements, materials, and equipment previously approved shall be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection, having jurisdiction. Minor repairs and minor alterations may be made to the same standard as the original installation.

(2) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 111.90—ELECTRICAL EQUIPMENT AND INSTALLATIONS ON VESSELS CONTRACTED FOR PRIOR TO NOVEMBER 19, 1952

§ 111.90–1 *General.* The electrical installations on existing vessels shall be maintained in good electrical and me-

chanical condition to the satisfaction of the Officer in Charge, Marine Inspection, having jurisdiction.

§ 111.90–5 *Major alterations.* Major alterations and major extensions to electrical installations on existing vessels shall be made to the same standard as required for new vessels. Minor repairs and minor alterations may be made to the same standard as the original installation, in §§ 111.90–10, 111.90–15, 111.90–20, and 111.90–25: *Provided,* That in no case, will a greater departure from the standards of this subchapter be permitted than presently exist.

§ 111.90–10 *Vessels contracted for prior to July 1, 1937.* (a) On vessels contracted for between June 30, 1928 and July 1, 1937, inclusive, using electricity for any purpose, the installation shall be in keeping with the best modern practice.

(1) Wires shall be armored or run in approved metal conduits. Metal conduit or armored casing shall be required in bunkers, cargo spaces, storerooms, etc., and in all places where the leads are liable to mechanical injury. Joints in wiring shall be avoided as far as possible in the above named spaces, and where joints are necessary they shall be made in metal boxes, readily accessible and protected in the same manner as the leads.

(2) When wires are led through beams, frames, or nonwatertight bulkheads, they shall be carried either in metal conduits, armored casing, or protected by hard rubber, or other equivalent bushings.

(3) When wires are carried through watertight decks or bulkheads, they shall be provided with a suitable stuffing box at deck or bulkhead. Where such points are liable to mechanical injury, they shall be protected by suitable boxes or cages.

(4) In locating the wiring system as a whole, care shall be taken to provide accessibility for examination and repair. Special care shall be taken to avoid any arrangement which might permit the lodgment of standing water, and, when necessary, openings in conduits or drains shall be installed to accomplish this purpose.

(5) All fixtures, taps, joints, and splices shall be fitted with metal boxes. Boxes in cargo and machinery spaces, galley, and those exposed to weather shall be watertight.

(6) Splices shall be so joined as to be both mechanically and electrically secure without solder. They shall then be soldered and properly insulated and further protected by waterproof tape.

(b) On vessels contracted for prior to June 30, 1928, the changes or alterations in the electrical installations shall be in accordance with the requirements of this section.

§ 111.90–15 *Vessels contracted for between July 2, 1937, and January 1, 1939.* On vessels contracted for between July 2, 1937, and January 1, 1939, inclusive, the electrical installation shall be in accordance with the "Recommended Practise for Electrical Installations on Shipboard," AIEE Standard No. 45, October 1930, as published by the American Institute of Electrical Engineers.

§ 111.90–20 *Vessels contracted for between January 2, 1939, and June 1, 1941.* On vessels contracted for between January 2, 1939, and June 1, 1941, inclusive, the electrical installation shall be in accordance with the "Recommended Practise for Electrical Installations on Shipboard," AIEE Standard No. 45, December 1938, as published by the American Institute of Electrical Engineers.

§ 111.90–25 *Vessels contracted for between June 2, 1941, and November 18, 1952.* (a) On vessels contracted for between June 2, 1941, and November 18, 1952, inclusive, the electrical installation shall be in accordance with the "Recommended Practise for Electrical Installations on Shipboard," AIEE Standard No. 45, July 1940, as published by the American Institute of Electrical Engineers.

(b) For vessels the contract for the construction of which was signed prior to September 2, 1945, the specification covering electrical installations titled "United States Coast Guard, Merchant Marine Inspection, Specification for Electrical Installations on Merchant Vessels," dated August 31, 1944, revised March 6, 1945, is, during the Unlimited National Emergency, applicable as alternative provisions to those contained in this section.

(c) For vessels the contract for the construction of which is signed on and after September 2, 1945, those parts of the specification covering electrical installations titled "United States Coast Guard, Merchant Marine Inspection, Specification for Electrical Installations on Merchant Vessels," dated August 31, 1944, revised March 6, 1945, specified in paragraphs 1, 4, and 5 thereof, relating to electric cable are, during the Unlimited National Emergency, applicable as alternative provisions to those contained in this section.

PART 112—EMERGENCY LIGHTING AND POWER SYSTEM

Chapter I is amended by adding a new Part 112 in Subchapter J, reading as follows:

SUBPART 112.01—APPLICATION

Sec.
112.01–1 General.

SUBPART 112.05—GENERAL REQUIREMENTS

112.05–1 Source of power.
112.05–5 Emergency source of supply.
112.05–10 Emergency lights.
112.05–15 Emergency lighting system for small passenger vessels.

SUBPART 112.10—CLASSIFICATION OF EMERGENCY LIGHTING AND POWER SYSTEMS

112.10–1 General.
112.10–5 Manual emergency lighting and power system.
112.10–10 Automatic emergency lighting and power system.
112.10–15 Temporary source of emergency lighting and power.
112.10–20 Final source of emergency lighting and power.

SUBPART 112.15—EMERGENCY LOADS

Sec.
112.15–1 Temporary emergency source loads.
112.15–5 Final emergency source loads.
112.15–10 Single automatically started source loads.
112.15–15 Manually started source loads.

SUBPART 112.20—OPERATION OF EMERGENCY SYSTEMS HAVING BOTH A TEMPORARY AND A FINAL SOURCE OF EMERGENCY LIGHTING AND POWER

112.20–1 Emergency Loads.
112.20–5 Reduction of potential.
112.20–10 Diesel driven emergency source of power.
112.20–15 Potential of final source.

SUBPART 112.25—OPERATION OF EMERGENCY SYSTEMS HAVING AN AUTOMATIC STARTING DIESEL-ENGINE-DRIVEN EMERGENCY GENERATOR AS THE SOLE SOURCE OF EMERGENCY LIGHTING AND POWER

112.25–1 Emergency Loads.
112.25–5 Reduction of potential.
112.25–10 Operation requirements.

SUBPART 112.30—OPERATION OF EMERGENCY SYSTEMS HAVING AN AUTOMATICALLY CONNECTED STORAGE BATTERY AS THE SOLE SOURCE OF EMERGENCY LIGHTING AND POWER

112.30–1 Emergency loads.
112.30–5 Reduction of potential.
112.30–10 Operation requirements.

SUBPART 112.35—OPERATION OF A MANUALLY CONTROLLED EMERGENCY SYSTEM HAVING A STORAGE BATTERY OR A DIESEL-ENGINE-DRIVEN GENERATOR AS THE SOLE SOURCE OF EMERGENCY LIGHTING AND POWER

112.35–1 Manual operation requirements.
112.35–5 Means for starting.

SUBPART 112.40—INSTALLATIONS REQUIRING AN ALTERNATING-CURRENT TEMPORARY SOURCE OF SUPPLY

112.40–1 General requirements.

SUBPART 112.45—VISIBLE INDICATORS AND TEST SWITCH

112.45–1 Visible indicators.
112.45–5 Test switch.

SUBPART 112.50—EMERGENCY DIESEL-ENGINE-DRIVEN GENERATOR SETS

112.50–1 General requirements.

SUBPART 112.55—STORAGE BATTERY INSTALLATION

112.55–1 General requirements.
112.55–5 Emergency lighting loads.
112.55–10 Storage battery requirements.
112.55–15 Capacity of storage battery.

SUBPART 112.90—EMERGENCY LIGHTING AND POWER SYSTEMS FOR VESSELS CONTRACTED FOR PRIOR TO NOVEMBER 19, 1952

112.90–1 General.
112.90–5 Emergency lighting system for ocean and coastwise passenger vessels contracted for prior to November 19, 1952.
112.90–10 Emergency lighting system for passenger vessels other than ocean and coastwise passenger vessels contracted for prior to November 19, 1952.

AUTHORITY: §§ 112.01–1 to 112.90–10 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4426, 4427, 4433, 4453, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1384, 1544, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 392, 399, 404, 405, 411, 435, 366, 395, 363, 369, 367, 463a, 1333, 50 U. S. C. App. 1275.

SUBPART 112.01—APPLICATION

§ 112.01–1 *General.* The provisions of this part, with the exception of Subpart 112.90, shall apply to all vessels contracted for on or after November 19, 1952. The provisions of Subpart 112.90, shall apply to all vessels contracted for prior to November 19, 1952.

SUBPART 112.05—GENERAL REQUIREMENTS

§ 112.05–1 *Source of power.* (a) Vessels shall be provided with a source of power to supply emergency lighting and power sufficient for all requirements of safety in the different parts of the vessel and of a type and capacity in accordance with Table 112.05–1 (a), except as otherwise provided by § 112.05–15.

TABLE 112.05–1(a)

Size of vessel and service	Type or types of emergency source of power	Period of operation and minimum capacity of emergency source of power
Passenger vessels		
Ocean and Coastwise, 1,600 g. t. or over, and any passenger vessel, regardless of tonnage or service where electric power-operated watertight doors are required.	Storage battery with automatic transfer gear for temporary source.	½ hour.
	Supplemented by diesel generator with automatic starting and transfer gear for final source.	36 hours.
Ocean and Coastwise, over 15 g. t. but less than 1,600 g. t.	Storage battery with automatic transfer gear or diesel generator with automatic starting and transfer gear.	36 hours or twice the time of run, whichever is the smaller.
Other than Ocean and Coastwise, over 15 g. t. but less than 1,600 g. t.	Storage battery with automatic transfer gear or diesel generator with automatic starting and transfer gear.	8 hours or twice the time of run, whichever is the smaller.
Cargo vessels		
All waters, 1,600 g. t. and over.	Storage battery or diesel generator, automatic or manual operation.	12 hours.
All waters, 300 g. t. and over, but less than 1,600 g. t.	Storage battery, diesel generator, or approved safety lanterns, automatic or manual operation.	12 hours or twice the time of run, whichever is the smaller.

§ 112.05–5 *Emergency source of supply.* (a) The emergency source of supply shall be independent of the vessel's ship's service lighting and power plant and propulsion plant.

(b) The emergency source supply shall be located above the bulkhead deck or above the freeboard deck, whichever is the higher, and outside the machinery casing.

§ 112.05–10 *Emergency lights.* (a) Emergency lights supplied by an automatic emergency lighting system shall form a part of the regular lighting system and shall be continuously lighted at all times passengers or crew are aboard, except as provided by § 112.05–10.

(b) Emergency lights for the illumination of boats and embarkation decks, lifeboat launching gear, wheelhouse, chart room, and navigating instruments shall be controlled by switches located in the wheelhouse and need not be continuously lighted.

(c) Emergency lights on passenger vessels shall be marked with a red letter "E" of at least ½-inch in height as required by § 78.47–33 of Subchapter H (Passenger vessels) of this chapter.

§ 112.05–15 *Emergency lighting system for small passenger vessels.* (a) Small passenger vessels certificated to operate only between sunrise and sunset may not be required to install an emergency lighting system when specifically approved by the Commandant.

(b) Small passenger vessels certificated to operate not more than 15 miles offshore, may not be required to install an emergency lighting system when specifically approved by the Commandant: *Provided,* That a general lighting system whose source of supply is located above the bulkhead deck and independent of the propulsion plant, is installed.

SUBPART 112.10—CLASSIFICATIONS OF EMERGENCY LIGHTING AND POWER SYSTEMS

§ 112.10–1 *General.* (a) Emergency lighting and power systems are classified in accordance with the method provided to cause the system to apply potential to the emergency loads and in accordance with the basic function of the system.

§ 112.10–5 *Manual emergency lighting and power system.* (a) A manual emergency lighting and power system is one in which a single manual operation, such as the manual operation of a switch from an "off" to an "on" position, is required to cause the emergency lighting and power system to supply power to the emergency loads.

§ 112.10–10 *Automatic emergency lighting and power system.* (a) An automatic emergency lighting and power system is one in which a specified reduction in potential from the ship's service power and lighting plant will cause the emergency lighting and power system to supply power to the emergency loads.

§ 112.10–15 *Temporary source of emergency lighting and power.* (a) A temporary source of emergency lighting and power is one of limited capacity designed to carry, for a short time, selected emergency loads while an emergency source of larger capacity is being started.

§ 112.10–20 *Final source of emergency lighting and power.* (a) A final source of emergency lighting and power is one designed to function subsequent to the termination of the temporary source.

SUBPART 112.15—EMERGENCY LOADS

§ 112.15–1 *Temporary emergency source loads.* (a) The emergency lighting and power loads listed in this section shall be arranged so that they can be energized from the temporary emergency source.

(b) Navigation lights, if electric.

(c) A sufficient number of lights throughout machinery spaces to permit the performance of essential operations and observations under emergency conditions and to facilitate restoration of service.

(d) Lighting for passageways, stairways, and escape trunks in passenger quarters, crew quarters, public spaces, machinery spaces and work spaces, adequate to permit passengers and crew readily to find their way to open decks and to lifeboat embarkation and assembly points with all watertight doors and fire screen doors closed.

(e) Illuminated signs bearing the word "Exit" in red letters shall be installed in such locations throughout a passenger vessel so that from any portion of the vessel normally accessible to the passengers or crew, except machinery spaces, stores and similar spaces where the crew are not normally employed, and with all fire doors in stairway inclosures and main vertical zone bulkheads and all watertight doors closed, the direction of escape to the open deck will be apparent. For the purpose of this paragraph, individual staterooms and other similar small rooms will not be required to have such signs, but upon emerging from such rooms the direction of escape shall be apparent. (Also see § 111.50–15 (d) of this subchapter.)

(f) General illumination for safe operation of watertight doors, if installed and power operated.

(g) One or more lights in galleys, pantries, steering gear room, emergency power rooms, chart room, wheelhouse, and crews' mess and recreation rooms.

(h) Lighting for boat and embarkation decks and passenger assembly points for safe embarkation into the lifeboats.

(i) Electric communication systems essential under temporary emergency conditions and which do not have an independent storage battery source of power.

(j) Watertight door system, if installed and power operated.

(k) Emergency loudspeaker system, if installed.

(l) Fire screen door holding and release system, if installed.

(m) Smoke detector system, if installed.

(n) Supply to motor-generator or other conversion equipment where a temporary emergency source of alternating current is necessary for essential communication systems, emergency, or safety requirements.

§ 112.15–5 *Final emergency source loads.* (a) The emergency lighting and power loads listed in this section shall be arranged so that they can be energized from the final emergency source for the following:

(b) All loads listed in § 112.15–1, as indicated.

(c) Illumination for the safe operation of the lifeboat launching gear and the lifeboats in the process of, and immediately after, being launched.

(d) Charging panels of temporary emergency battery and of starting battery for diesel engine driving emergency generator.

(e) Morse and daylight signaling lights, if installed.

(f) Electric whistle and siren control, if installed.

(g) Submersible bilge pump, when installed as required by Subpart 55.10 of Subchapter F (Marine Engineering) of this chapter.

(h) Emergency fire pump, when installed as required by §§ 76.10–5, 76.17–5 and 76.20–5 of Subchapter H (Passenger Vessels) or Part 95 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(i) Emergency sprinkler system pump, when installed as required by § 76.25–35 (c) of Subchapter H (Passenger Vessels) of this chapter.

(j) Radio installation, if installed.

(k) Radio direction finder, if installed.

(l) Loran, if installed.

(m) Radar plan position indicator, if installed.

(n) Gyro-compass, if installed.

(o) Depth sounder, if installed.

§ 112.15–10 *Single automatically-started source loads.* When only a single automatically started source of emergency lighting and power is installed, the circuits listed in § 112.15–5, as indicated, shall be arranged so that they can be energized from the single emergency source of supply.

§ 112.15–15 *Manually started source loads.* (a) When a manually started emergency lighting and power system is installed, the circuits listed in § 112.15–5, as indicated, shall be arranged so that they may be energized from the emergency source of supply.

SUBPART 112.20—OPERATION OF EMERGENCY SYSTEMS HAVING BOTH A TEMPORARY AND A FINAL SOURCE OF EMERGENCY LIGHTING AND POWER

§ 112.20–1 *Emergency loads.* (a) The emergency loads listed in Subpart 112.15, as indicated, shall normally be energized from the ship's service generating plant through automatic transfer switches.

§ 112.20–5 *Reduction of potential.* (a) Upon reduction of potential from the normal source by 15 to 25 percent of normal value, the loads listed in Subpart 112.15 shall automatically be disconnected from the normal source, and the loads listed in § 112.15–1, as indicated, shall automatically be connected to the temporary source of emergency lighting and power.

§ 112.20–10 *Diesel driven emergency source of power.* (a) Simultaneous with the operation described in § 112.20–5, the diesel engine driving the final source (emergency generator) shall automatically be started with no load connected to the emergency generator.

§ 112.20–15 *Potential of final source.* (a) When the potential of the final source (emergency generator) reaches 85 to 95 percent of normal value, the emergency loads listed in Subpart 112.15, as indicated, shall automatically be transferred to this final source.

(b) When potential from the ship's service generating plant has been restored to normal, the emergency loads may be manually transferred to the normal source and the emergency generator manually stopped.

(c) Should the potential of the final source (emergency generator), while supplying the emergency loads, fall below 75 to 85 percent of normal value, the temporary emergency loads shall again be transferred to the temporary source as described in § 112.20–5.

SUBPART 112.25—OPERATION OF EMERGENCY SYSTEM HAVING AN AUTOMATIC STARTING DIESEL-ENGINE-DRIVEN EMERGENCY GENERATOR AS THE SOLE SOURCE OF EMERGENCY LIGHTING AND POWER

§ 112.25–1 *Emergency loads.* (a) The emergency loads listed in § 112.15–5, as indicated, shall normally be energized from the ship's service generating plant through automatic transfer switches.

§ 112.25–5 *Reduction of potential.* (a) Upon reduction of potential from the normal source by 15 to 25 percent of normal value, the emergency loads shall automatically be disconnected from the normal source and the diesel engine driving the emergency generator shall automatically be started with no load connected to the emergency generator.

§ 112.25–10 *Operation requirements.* (a) When the potential of the emergency generator reaches 85 to 95 percent of normal value, the emergency loads shall automatically be connected to the emergency generator.

(b) When potential from the ship's service generating plant has been restored to normal, the emergency loads may be manually transferred to the normal source and the emergency generator manually stopped.

SUBPART 112.30—OPERATION OF EMERGENCY SYSTEMS HAVING AN AUTOMATICALLY CONNECTED STORAGE BATTERY AS THE SOLE SOURCE OF EMERGENCY LIGHTING AND POWER

§ 112.30–1 *Emergency loads.* (a) The emergency loads listed in § 112.15–5, as indicated, shall normally be energized from the ship's service generating plant through automatic transfer switches.

§ 112.30–5 *Reduction of potential.* (a) Upon reduction of potential from the normal source by 15 to 25 percent of normal value, the emergency loads shall automatically be disconnected from the normal source and connected to the emergency storage battery.

§ 112.30–10 *Operation requirements.* (a) Upon restoration of potential from the normal source of 85 to 95 percent of normal values, the emergency loads shall automatically be transferred back to the normal source.

SUBPART 112.35—OPERATION OF A MANUALLY CONTROLLED EMERGENCY SYSTEM HAVING A STORAGE BATTERY OR A DIESEL-ENGINE-DRIVEN GENERATOR AS THE SOLE SOURCE OF EMERGENCY LIGHTING AND POWER

§ 112.35–1 *Manual operation requirements.* (a) Manually started emergency lighting and power systems shall require only a single manual operation, such as the manual operation of a switch from an "off" to an "on" position, to cause the emergency system to supply its connected loads.

§ 112.35–5 *Means for starting.* (a) For passenger vessels the means for starting the emergency system shall be located in the wheelhouse. For other vessels the starting means may be located in the wheelhouse or so as to be under the control of the chief engineer.

SUBPART 112.40—INSTALLATIONS REQUIRING AN ALTERNATING-CURRENT TEMPORARY SOURCE OF SUPPLY

§ 112.40–1 *General requirements.* (a) Installations requiring alternating current for the operation of communication equipment, or other apparatus essential under temporary emergency conditions, shall be provided with the necessary conversion equipment. Where such conversion equipment will be operating both under normal conditions and under temporary emergency conditions, the conversion equipment shall be provided in duplicate, together with automatic transfer gear to start the stand-by equipment and to transfer the loads upon reduction of potential as described in § 112.20–5.

SUBPART 112.45—VISIBLE INDICATORS AND TEST SWITCH

§ 112.45–1 *Visible indicators.* (a) Visible indicators shall be provided in the machinery space to indicate when the emergency loads are being supplied by an automatically controlled emergency source of supply (storage battery or emergency diesel generator).

§ 112.45–5 *Test switch.* (a) A test switch shall be provided at the emergency switchboard or other location as may be approved to simulate a failure of potential from the normal source, the operation of which switch will cause the emergency loads to be transferred.

SUBPART 112.50—EMERGENCY DIESEL-ENGINE-DRIVEN GENERATOR SETS

§ 112.50–1 *General requirements.* (a) The diesel engine of the generator set shall be complete with all accessories necessary for operation and protection of the engine, shall have a self-contained cooling system of size to assure continuous engine operation using 100 degrees F air, and the fuel used shall have a flashpoint of not less than 110 degrees F. The room in which the set is located shall be provided with suitable intake and exhaust ducts to supply adequate cooling air. The diesel engine shall be capable of carrying its full rated load within 20 seconds with cooling water and the air supply at a temperature of 32 degrees F. The diesel engine shall be electric starting unless otherwise approved, and the starting battery shall be of sufficient capacity to provide six consecutive cycles of cranking, each cycle to consist of approximately ½-minute of cranking followed by approximately 1 minute of battery rest, with a final voltage of not less than 50 percent of normal voltage. The diesel-engine-driven generator set shall lubricate and operate satisfactorily when permanently inclined to an angle of 22½ degrees

athwartship and 10 degrees fore and aft, and shall be arranged so that it will not spill oil under a vessel roll of 30 degrees each side of the vertical.

SUBPART 112.55—STORAGE BATTERY INSTALLATION

§ 112.55–1 *General requirements.* (a) Storage batteries shall be of a design and construction proven successful in merchant marine service and capable of withstanding the roll and pitch of a vessel and exposure to salt air. Positive plates of lead-acid batteries shall be at least 0.25 inch thick, and the specific gravity of the electrolyte when fully charged shall be 1.210 to 1.220, both inclusive, at 25 degrees C, except that thin positive plate construction (0.125 inch thick) and a specific gravity of the electrolyte when fully charged of 1.270 to 1.285, both inclusive, at 25 degrees C, may be used for engine cranking batteries.

§ 112.55–5 *Emergency lighting loads.* (a) When supplying emergency lighting loads, the storage battery initial voltage shall not exceed the nominal voltage by more than 5 percent.

§ 112.55–10 *Storage battery requirements.* (a) Storage battery installations for emergency lighting and power shall include the necessary apparatus automatically to maintain the battery in a fully charged condition. At all times when the ship's service source of supply is available, the battery shall be furnished a continuous trickle charge, except that, after a battery discharge, the battery shall be automatically charged at a higher rate until the battery voltage increases to a predetermined point. Charging operations shall not create an absence of battery power at any time. Instruments to show the rate of charge or discharge shall be provided.

§ 112.55–15 *Capacity of storage battery.* (a) The capacity of a storage battery shall be ample to close each watertight door three times and to open each watertight door two times, and to carry the remaining emergency loads continuously for the duration of time required by Table 112.05, at the end of which time the potential of the storage battery shall be not less than 87.5 percent of normal. The normal potential of a lead-acid storage battery will be taken as 2.0 volts per cell; the normal potential of a nickel-alkaline (Edison) storage battery will be taken as 1.2 volts per cell.

SUBPART 112.90—EMERGENCY LIGHTING AND POWER SYSTEMS FOR VESSELS CONTRACTED FOR PRIOR TO NOVEMBER 19, 1952

§ 112.90–1 *General.* (a) Existing arrangements, materials, and facilities previously approved, but not meeting the applicable specifications or requirements set forth in Subparts 112.05 through 112.55, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation: *Provided*, That, in no case, will a greater departure from the standards of Subparts 112.05 through 112.55 be permitted than presently exist.

(b) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

§ 112.90–5 *Emergency lighting system for ocean and coastwise passenger vessels contracted for prior to November 19, 1952.* (a) The emergency lighting system for ocean and coastwise passenger vessels contracted for prior to November 19, 1952, shall be in accordance with this section.

(b) Provision shall be made on all passenger vessels for an electric or other system of lighting, sufficient for all requirements of safety, in the different parts of the ship. There shall be a self-contained source capable of supplying, when necessary, this safety lighting system, and placed in the upper parts of the ship above the margin line.

(c) The exit from every main compartment occupied by passengers or crew shall be continuously lighted by an emergency lamp. The power for these emergency lamps shall be so arranged that they will be supplied from the independent installations referred to in paragraph (b) of this section in the event of failure of the main generating plant.

(d) On all passenger vessels contracted for on and after July 1, 1935, or where existing emergency installations operated by internal combustion engines are replaced, the emergency generator shall be driven by a diesel or semi-diesel engine, equipped with means for quick starting. Such emergency equipment shall be located in steel or iron compartments or rooms on the deck above the weather deck and isolated from the passenger and crew quarters. Where existing installations of emergency engines and generators are located in wooden compartments or rooms, such compartments or rooms shall be made fire-resistant by lining same with asbestos board having a thickness of not less than one-quarter inch over which iron or steel sheathing shall be fitted.

(e) Provision shall be made on all passenger vessels, where the boat deck is more than 30 feet above the water line at the lightest seagoing draft, for readily and continuously available illumination from the vessel of lifeboats when along side and in process of, or immediately after, being launched. There shall be a self-contained source capable of supplying, when necessary, this safety lighting system and placed in the upper part of the vessel above the bulkhead deck.

(f) The emergency generating set will ordinarily provide a satisfactory source of illumination, and, where used for this purpose, it shall be of sufficient power to provide for such illumination in addition to other demands made upon the set.

§ 112.90–10 *Emergency lighting system for passenger vessels other than ocean and coastwise passenger vessels contracted for prior to November 19, 1952.* (a) The emergency lighting system for passenger vessels other than ocean and coastwise passenger vessels contracted for prior to November 19, 1952, shall be in accordance with this section.

(b) All vessels engaged in the passenger service, which are electrically lighted by dynamos or other electric units, located below the deep-load line of the vessel, shall have on board an emergency electric lighting system located above the deep-load line to light the vessel sufficiently to enable the passengers and crew to find their way to the exits in the event of failure of the main lighting system. The emergency lighting system shall at all times be ready for immediate use, and shall be installed and arranged so that all emergency lights may be switched on from the pilothouse, navigation bridge, or a central station.

(c) On all passenger vessels contracted for on and after July 1, 1935, or where existing emergency installations operated by internal-combustion engines are replaced, the emergency generator shall be driven by a diesel or semi-diesel engine, equipped with means for quick starting. Such emergency equipment shall be located in steel or iron compartments or rooms on the deck above the weather deck and isolated from the passenger and crew quarters. Where existing installations of emergency engines and generators are located in wooden compartments or rooms, such compartments or rooms shall be made fire-resistant by lining same with asbestos board having a thickness of not less than one-quarter inch over which iron or steel sheathing shall be fitted.

(d) Provision shall be made on all passenger vessels, where the boat deck is more than 30 feet above the water line at the lightest seagoing draft, for readily and continuously available illumination from the vessel of lifeboats when alongside and in process of, or immediately after, being launched. There shall be a self-contained source capable of supplying, when necessary, this safety lighting system and placed in the upper part of the vessel above the bulkhead deck.

(1) The emergency generating set will ordinarily provide a satisfactory source of illumination, and, where used for this purpose, it shall be of sufficient power to provide for such illumination in addition to other demands made upon the set.

PART 113—COMMUNICATION AND ALARM SYSTEMS AND EQUIPMENT

Part 113 is amended by changing the title from "Boats, Rafts, Bulkheads, and Lifesaving Appliances" to "Communication and Alarm Systems and Equipment," and the text of Part 113 is canceled and the following new regulations are added:

SUBPART 113.01—APPLICATION

Sec.
113.01–1 Vessels subject to requirements.

SUBPART 113.05—GENERAL PROVISIONS

113.05–1 Supplementary requirements.
113.05–5 Equipment of an approved type.

SUBPART 113.10—AUTOMATIC FIRE DETECTING AND ALARM SYSTEMS

113.10–1 Application.
113.10–5 General Requirements.
113.10–90 Equipment and installations on vessels contracted for prior to November 19, 1952.

SUBPART 113.15—MANUAL FIRE ALARM SYSTEMS

Sec.
113.15–1 Application.
113.15–5 General requirements.
113.15–90 Equipment and installations on vessels contracted for prior to November 19, 1952.

SUBPART 113.20—AUTOMATIC SPRINKLER SYSTEMS

113.20–1 Application.
113.20–5 General requirements.
113.20–90 Equipment and installations on vessels contracted for prior to November 19, 1952.

SUBPART 113.25—GENERAL ALARM SYSTEMS

113.25–1 Application.
113.25–5 Operation.
113.25–10 General requirements.
113.25–15 Detail requirements.
113.25–20 Marking of equipment.
113.25–25 General alarm system for manned ocean and coastwise barges.
113.25–90 General alarm system for existing vessels.

SUBPART 113.30—SOUND POWERED TELEPHONE AND VOICE TUBE SYSTEMS

113.30–1 Application.
113.30–5 General requirements.
113.30–10 Voice tubes, general requirements.
113.30–15 Voice tubes, detail requirements.
113.30–20 Sound powered telephone system, general requirements.
113.30–25 Sound powered telephone system, detail requirements.
113.30–90 Sound powered telephone and voice tube systems for existing vessels.

SUBPART 113.35—ENGINE ORDER TELEGRAPH SYSTEMS

113.35–1 Application.
113.35–5 General requirements.
113.35–10 Engine gong systems, general requirements.
113.35–15 Engine gong systems, application.
113.35–20 Mechanical engine order telegraph systems, general requirements.
113.35–25 Mechanical engine order telegraph systems, detail requirements.
113.35–30 Mechanical engine order telegraph systems, operation.
113.35–35 Mechanical engine order telegraph systems, application.
113.35–40 Electric engine order telegraph systems, general requirements.
113.35–45 Electric engine order telegraph systems, detail requirements.
113.35–50 Electric engine order telegraph system, operation.
113.35–55 Electric engine order telegraph systems, application.
113.35–90 Engine order telegraph systems for existing vessels.

SUBPART 113.40—RUDDER ANGLE INDICATOR SYSTEMS

113.40–1 Application.
113.40–5 General requirements.
113.40–10 Detail requirements.
113.40–90 Rudder angle indicator systems for existing vessels.

SUBPART 113.45—REFRIGERATED SPACES ALARM SYSTEMS

113.45–1 Application.
113.45–5 General requirements.
113.45–90 Refrigerated spaces alarm systems on existing vessels.

SUBPART 113.50—EMERGENCY LOUDSPEAKER SYSTEMS

113.50–1 Application.
113.50–5 General requirements.
113.50–10 Power supply.
113.50–15 Location of loudspeakers.
113.50–20 Distribution of cable runs.
113.50–25 Type of cable and equipment enclosures.
113.50–30 Shipboard tests.
113.50–35 Operation of emergency loudspeaker systems.
113.50–90 Emergency loudspeaker systems for existing vessels.

SUBPART 113.55—NAVIGATION LIGHTS

113.55–1 Application.
113.55–5 General requirements.
113.55–10 Construction of navigation lights.
113.55–15 Installation of navigation lights.
113.55–20 Light screens.
113.55–25 Navigation light indicator panel.
113.55–90 Navigation lights for existing vessels.

SUBPART 113.60—SIGNALING LIGHTS

113.60–1 Application.
113.60–5 General requirements.
113.60–10 Detail requirements.
113.60–90 Signaling light for existing vessels.

SUBPART 113.65—WHISTLE OPERATORS

113.65–1 Application.
113.65–5 General requirements.
113.65–90 Whistle operators for existing vessels.

SUBPART 113.70—SMOKE DETECTOR SYSTEMS

113.70–1 Application.
113.70–5 General requirements.
113.70–10 Power supply.
113.70–90 Equipment and installations on vessels contracted for prior to November 19, 1952.

AUTHORITY: §§ 113.10–1 to 113.70–90 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C 375, 416. Interpret or apply R. S. 4399, 4400, 4417, 4418, 4421, 4426, 4427, 4433, 4453, as amended, sec. 14, 29 Stat. 690, sec. 10, 35 Stat. 428, 41 Stat. 305, 49 Stat. 1384, 1544, sec. 17, 54 Stat. 166, sec. 3, 54 Stat. 346, sec. 2, 54 Stat. 1028, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 361, 362, 391, 392, 399, 404, 405, 411, 435, 366, 395, 363, 369, 367, 526p, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 113.01—APPLICATION

§ 113.01–1 *Vessels subject to requirements.* (a) The provisions of this part shall apply to all vessels except as specifically noted in this part.

SUBPART 113.05—GENERAL PROVISIONS

§ 113.05–1 *Supplementary requirements.* (a) The provisions of this part are supplementary to the general requirements for electrical systems and apparatus contained in this subchapter.

§ 113.05–5 *Equipment of an approved type.* (a) Where equipment in this part is required to be of an approved type, such equipment shall be of a type approved by the Commandant.

(b) Specifications for many of the items required to be of an approved type have been promulgated and are contained in Subchapter Q (Specifications) of this chapter. In general, such specifications are of interest only to the manufacturer of specific items of equipment.

SUBPART 113.10—AUTOMATIC FIRE DETECTING AND ALARM SYSTEMS

§ 113.10–1 *Application.* (a) Where an electric fire detecting and alarm system is installed, the provisions of this subpart, with the exception of § 113.10–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 113.10–90.

(b) For the vessels on which an automatic fire detecting and alarm system is required see Part 76 of Subchapter H (Passenger Vessels) of this chapter.

§ 113.10–5 *General requirements.* (a) Fire alarm annunciators, power supply, fire detectors, test stations, and vibrating bells shall be of a type approved by the Commandant.

(b) All electric cables installed in conjunction with fire detecting and alarm systems shall be lighting and power or interior communication cable, either leaded and armored or impervious sheathed and armored.

(c) Cable runs between the fire alarm annunciator and fire detecting zones shall be as direct as possible, and shall avoid, where possible, staterooms, lockers, and other enclosed spaces where this cable could be damaged by a localized fire or by other causes.

(d) Conductors for several fire detecting zones may be run in a multi-conductor cable, but a conductor shall not be used as a common return from two or more zones.

(e) Connection boxes containing conductors to more than one fire detecting zone shall be of watertight construction and the cable entrances shall be made tight by means of terminal or stuffing tubes.

(f) Connection boxes for fire detector stations, manual alarm stations, test stations, or other boxes containing the conductors of a single fire detecting zone, may be of nonwatertight construction, if installed in a dry location.

§ 113.10–90 *Equipment and installations on vessels contracted for prior to November 19, 1952.* (a) Existing arrangements, materials, and facilities previously approved, but not meeting the applicable specifications or requirements set forth in § 113.10–5, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation: *Provided*, That, in no case, will a greater departure from the standards of § 113.10–5 be permitted than presently exist. All new installations or major replacements shall meet the applicable specifications or requirements.

(b) All conductors shall conform to specifications for interior communication cable contained in the marine rules as adopted by the American Institute of Electrical Engineers as regards construction, size, leading, armoring, protection, support, and details of installation, with the following exceptions:

(1) All conductors shall be lead sheathed to protect against moisture and conductors exposed to mechanical injury shall be leaded and armored.

(2) Lead-sheathed conductors may be used for voltages of 60 volts or less.

(3) In single-wire, closed-circuit systems (series) approved metallic sheathed wire shall be used in connecting thermostats in each thermostat zone, but approved multiconductor cable may be used

to connect the several individual zones to the annunciator panel.

SUBPART 113.15—MANUAL FIRE ALARM SYSTEMS

§ 113.15–1 *Application.* (a) Where an electric manual fire alarm system is installed, the provisions of this subpart, with the exception of § 113.15–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 113.15–90.

(b) For the vessels on which a manual fire alarm system is required, see Part 76 of Subchapter H (Passenger Vessels) of this chapter.

§ 113.15–5 *General requirements.* (a) Manual fire alarm annunciator, power supply, manual stations, and vibrating bells shall be of a type approved by the Commandant.

(b) All electric cables installed in conjunction with manual fire alarm systems shall be lighting and power or interior communication cable, either leaded and armored or impervious sheathed and armored.

(c) Cable runs between the annunciator and fire alarm zones shall be as direct as possible, and shall avoid, where possible, staterooms, lockers, and other enclosed spaces where the cable could be damaged by a localized fire or by other causes.

(d) Conductors for several fire alarm zones may be run in a multiconductor cable, but a conductor shall not be used as a common return from two or more zones.

(e) Connection boxes containing conductors to more than one fire alarm zone shall be of watertight construction and the cable entrances shall be made tight by means of terminal or stuffing tubes.

(f) Connection boxes for manual stations, or other boxes containing the conductors of a single fire alarm zone, may be of nonwatertight construction if installed in a dry location.

§ 113.15–90 *Equipment and installations on vessels contracted for prior to November 19, 1952.* (a) Existing arrangements, materials, and facilities previously approved, but not meeting the applicable specifications or requirements set forth in § 113.15–5, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation: *Provided*, That, in no case, will a greater departure from the standards of § 113.15–5 be permitted than presently exist. All new installations or major replacements shall meet the applicable specifications or requirements.

(b) All conductors shall conform to specifications for interior communication cable contained in the marine rules as adopted by the American Institute of Electrical Engineers as regards construction, size, leading, armoring, protection, support, and details of installation, with the following exceptions:

(1) All conductors shall be lead sheathed to protect against moisture and conductors exposed to mechanical injury shall be leaded and armored.

(2) Lead-sheathed conductors may be used for voltages of 60 volts or less.

(3) In single-wire, closed-circuit systems (series) approved metallic sheathed wire shall be used in connecting thermostats in each thermostat zone, but approved multiconductor cable may be used to connect the several individual zones to the annunciator panel.

SUBPART 113.20—AUTOMATIC SPRINKLER SYSTEMS

113.20–1 *Application.* (a) When an automatic sprinkler system is installed, the provisions of this subpart, with the exception of § 113.20–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 113.20–90.

§ 113.20–5 *General requirements.* (a) The general requirements for automatic sprinkler systems are contained in Subpart 76.25 of Subchapter H (Passenger Vessels) of this chapter.

(b) The sprinkler alarm system, including annunciator, power supply, alarm switches, and bells shall be of an approved type.

(c) All electric cable employed in a sprinkler alarm system shall be lighting and power or interior communication cable, either leaded and armored or impervious sheathed and armored.

(d) All connection boxes, alarm switches, pressure switches, or level switches, etc., employed in the system shall be of watertight construction.

§ 113.20–90 *Equipment and installations on vessels contracted for prior to November 19, 1952.* (a) Existing arrangements, materials, and facilities previously approved, but not meeting the applicable specifications or requirements set forth in § 113.20–5, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation: *Provided*, That, in no case, will a greater departure from the standards of § 113.20–5 be permitted than presently exist. All new installations or major replacements shall meet the applicable specifications or requirements.

(b) All conductors shall conform to specifications for interior communication cable contained in the marine rules as adopted by the American Institute of Electrical Engineers as regards construction, size, leading, armoring, protection, support, and details of installation, with the following exceptions:

(1) All conductors shall be lead-sheathed to protect against moisture and conductors exposed to mechanical injury shall be leaded and armored.

(2) Lead-sheathed conductors may be used for voltages of 60 volts or less.

(3) In single-wire, closed-circuit systems (series) approved metallic sheathed wire shall be used in connecting thermostats in each thermostat zone, but approved multi-conductor cable may be used to connect the several individual zones to the annunciator panel.

(c) Where a motor-driven sprinkler pump is installed, it shall be capable of being operated from the emergency electrical circuit in case of failure of the main power.

SUBPART 113.25—GENERAL ALARM SYSTEM

§ 113.25–1 *Application.* (a) The provisions of this subpart, with the exception of §§ 113.25–25 and 113.25–90, shall apply to all manned vessels of over 100 gross tons, except barges, scows, and similar vessels, contracted for on or after November 19, 1952.

(b) The provisions of § 113.25–25 shall apply to all manned ocean and coastwise barges of over 100 gross tons, where the crew is divided into watches for the purpose of steering, contracted for on or after November 19, 1952.

(c) The provisions of § 113.25–90 shall apply to all manned vessels of over 100 gross tons, except barges, scows, and similar vessels, contracted for prior to November 19, 1952.

§ 113.25–5 *Operation.* (a) The general alarm system shall consist of electric vibrating bells located throughout passengers' and crew's quarters, machinery spaces, and work spaces, and so located as to warn all occupants in an emergency.

(b) The general alarm system shall be operated by means of a manually operated contact maker located in the wheelhouse.

(c) On vessels on which an emergency squad is organized and on vessels having a manual fire alarm system, a second manually operated contact maker shall be located in the wheelhouse and so connected as to operate only the general alarm bells located in crew's quarters and machinery spaces.

§ 113.25–10 *General requirements*—(a) *Power supply.* (1) The power supply for the general alarm system shall be a storage battery of sufficient capacity to supply the general alarm system for a period of at least 8 hours continuously without being recharged. Where duplicate storage batteries are provided in accordance with subparagraph (5) of this paragraph, the required ampere-hour battery capacity may be divided between the two batteries.

(2) The nominal potential of the general alarm system storage battery shall be not less than 6 volts and not more than 115 volts.

(3) Other communication or alarm equipment or system may be supplied from the general alarm system storage battery provided:

(i) The capacity of the storage battery is sufficient, without recharging, to supply all such equipment at maximum expected demand for a period of at least 8 hours, in addition to the capacity required for the general alarm system by subparagraph (1) of this paragraph and,

(ii) The system is so protected that a fault in any other communication or alarm equipment or system supplied by the general alarm system storage battery will not interfere with the operation of the general alarm system.

(4) The general alarm system storage battery shall be located above the bulkhead deck, or above the freeboard deck, whichever is the higher, and in a protected area.

(5) The general alarm system supply shall be either:

(i) Duplicate storage batteries so connected, in combination with a manual two-position transfer switch (having no OFF position), that one battery will be charged automatically while the other battery is available for furnishing power to the system; or

(ii) One storage battery in combination with an automatic charging panel that will maintain the battery in a fully charged condition at all times except immediately following a discharge.

(6) When the general alarm system is the only load supplied by the general alarm system battery or batteries, the battery or batteries shall be protected against overcurrent by enclosed fused switches or circuit breakers having provisions for locking to prevent either unauthorized operation of the switch or circuit breaker or unauthorized tampering with the fuses. The fused switch or circuit breaker shall be located outside of, but adjacent to, the battery room or battery locker and the capacity of the fuses or circuit breaker shall be not less than 200 percent of the connected load.

(7) When the general alarm system is supplied from storage batteries supplying loads in addition to the general alarm system, an interior communication distribution switchboard shall be provided in addition to the fused switch or circuit breaker required by subparagraph (6) of this paragraph. The interior communication switchboard shall provide a fused switch or circuit breaker for each system supplied, and the general alarm system fused switch or circuit breaker shall have provision for locking to prevent either unauthorized operation of the switch or circuit breaker or unauthorized access thereto. The capacity of any system overcurrent device shall be not greater than 25 percent of the capacity of the battery overcurrent device, and the capacity of the battery overcurrent device shall be approximately 200 percent of the total connected load.

(b) *Distribution of general alarm system feeder and branch circuits.* (1) A distribution panel shall be provided to divide the system into the required number of zone feeders. The distribution panel shall afford overcurrent protection for each zone feeder, but no disconnect switches shall be provided.

(2) At least one feeder shall be provided for each vertical fire zone in which general alarm bells are located.

(3) One or more branch-circuit distribution panels shall be provided for each zone feeder with at least one fused branch circuit for each deck level. The distribution panels shall be located above the bulkhead deck, or above the freeboard deck, whichever is the higher, in the zone served, and no disconnect switches shall be provided for the branch circuits.

(4) No more than five general alarm bells shall be connected to one branch circuit and a branch circuit shall not supply bells on more than one deck level.

(5) On vessels not divided into fire zones by main vertical fire bulkheads, the vessel shall be divided into vertical zones not exceeding 150 feet in length and a general alarm feeder provided for each such zone in which general alarm bells are required.

(6) Distribution panels shall be provided with means for locking to prevent unauthorized access to the overcurrent protective devices.

(7) On vessels where accommodation spaces are located only at the extremities of the vessels, other arrangements of feeders and branch circuits will be considered.

(c) *Location of general alarm bells.* (1) General alarm bells shall be so distributed throughout passenger and crew quarters in such number and in such a manner as to obtain in each room with the door closed either:

(i) A sound level of not less than 75 decibels; or,

(ii) A sound level of 20 decibels above the ground noise level existing when the vessel is underway in moderate weather, whichever is the higher.

(2) General alarm bells shall be so distributed throughout public spaces, work spaces, and machinery spaces in such number and in such a manner as to warn all occupants in an emergency.

§ 113.25–15 *Detail requirements*—(a) *Storage batteries.* (1) Storage batteries shall comply with the requirements of Subpart 112.55 of this subchapter.

(2) At the end of the discharge period specified by § 113.25–10 (a), the battery potential shall be not less than 80 percent of nominal potential.

(b) *Contact maker.* (1) The contact maker shall be a normally open circuit spring-return-to-normal type of enclosed watertight switch.

(2) The contact maker shall be designed to close its contacts when a substantial operating handle is rotated in a clockwise direction through an arc of approximately 60 degrees.

(3) The switch handle shall have means provided for locking in the ON position by means of a spring loaded locking pin.

(4) The OFF and ON positions of the operating handle shall be indicated by means of prominently raised letters.

(5) The contact maker shall be provided with mechanical stops to limit the rotation of the operating handle.

(6) The contact maker shall have an inductive load rating not less than the connected load. On large vessels, consideration will be given to the use of auxiliary devices to interrupt the load current.

(c) *Vibrating bells.* (1) Vibrating bells installed in conjunction with a general alarm system shall be of a type approved by the Commandant.

(2) General alarm system vibrating bells shall produce a signal of a tone distinct from that of any other bell signals on the vessel.

(d) *Electric cable and distribution fittings.* (1) All cable installed in conjunction with general alarm systems shall be lighting and power or interior communication cable, either leaded and armored or impervious sheathed and armored.

(2) Cable entrances to all bells and distribution fittings shall be made tight by means of terminal or stuffing tubes.

(3) Distribution panels shall be of watertight construction and shall be of a type requiring the use of a tool to gain entrance to the box.

(4) All fuses employed in a general alarm system shall be 250-volt National Electrical Code cartridge fuses bearing the approval label of a recognized testing organization.

(5) General alarm system fuse capacities shall be selected to obtain as wide a differential as possible between branch circuit fuses and feeder fuses. The capacity of a feeder fuse shall be at least 200 percent of load supplied, and the capacity of a branch circuit fuse shall not exceed 25 percent of the capacity of the feeder fuse.

§ 113.25–20 *Marking of equipment.* (a) Each general alarm system fused switch and distribution panel shall be provided with a permanent nameplate on the outside of the door describing its function. The rating of fuses shall also be indicated for fused switches.

(b) The general alarm contact maker shall be marked with lettering on a corrosion-resistant plate or with a sign in red letters on a suitable background "GENERAL ALARM."

(c) A contact maker to operate only the general alarm bells in crew quarters, machinery and work spaces shall be marked as described in paragraph (b) of this section, except with the words "CREW ALARM."

(d) General alarm bells shall be marked in not less than ½-inch red letters "GENERAL ALARM—WHEN BELL RINGS GO TO YOUR STATION."

(e) Each general alarm system distribution panel shall be provided with a directory attached to the inside of the cover giving the designation of each circuit, the area supplied by each circuit, and the rating of all circuit fuses.

§ 113.25–25 *General alarm system for manned ocean and coastwise barges.* (a) Each manned ocean and coastwise barge of over 100 gross tons, where the crew is divided into watches for the purpose of steering the vessel, shall be provided with a suitable alarm bell installation.

§ 113.25–90 *General alarm system for existing vessels.* (a) All vessels of over 100 gross tons the construction of which was begun on or after September 1, 1943, but prior to November 19, 1952, shall have all sleeping accommodations, public spaces, and machinery spaces equipped with a sufficient number of alarm bells so located as to warn all occupants. The system shall operate from a continuous source of electric energy capable of supplying the system for a period of at least 8 hours without being dependent upon the main, auxiliary or emergency generating plants. Each bell shall produce a signal of a tone distinct from that of other bell signals in the vicinity and shall be independently fused with each of these fuses located above the bulkhead deck. The bells shall be controlled by a

manually operated contact maker located in the pilothouse, or, if specific approval is given by the Commandant, in the fire control station. The characteristics of the contact maker shall be such that it possesses:

(1) Positive contact;

(2) Watertightness (when located in open spaces subject to weather);

(3) Means whereby its electrically open or closed position can be determined by sense of touch;

(4) Means to effect a make-and-break circuit for signalling; and

(5) Self-maintaining contacts.

(b) All vessels of over 100 gross tons the construction of which was begun prior to September 1, 1943, shall have all sleeping accommodations equipped with a sufficient number of alarm bells so located as to warn all the occupants. The alarm bells, if electric, shall be operated from an open switch from the pilothouse or bridge. The bells shall be of such size, character, and construction as to provide an alarm throughout the spaces for which they are provided.

(c) Existing arrangements, materials, and equipment previously approved shall be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation. All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.30—SOUND POWERED TELEPHONE AND VOICE TUBE SYSTEMS

§ 113.30–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.30–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 113.30–90.

§ 113.30–5 *General requirements.* (a) Vessels shall be provided with an efficient means of communication between each of the following:

(1) Wheelhouse;

(2) Engine room;

(3) Steering gear room, if located outside of engine room; and

(4) Emergency steering station, if required.

(b) Vessels equipped with a gyro compass system shall be provided with an efficient means of communication between the master gyro compass and the wheelhouse repeater compass.

(c) Vessels equipped with a radar plan position indicator installation remotely located from the wheelhouse shall be provided with an efficient means of communication between the wheelhouse and the radar plan position indicator.

(d) Where emergency squad equipment is stowed in lockers or spaces remote from the wheelhouse, an efficient means of communication shall be provided between the wheelhouse and the emergency squad equipment stowage space or spaces.

(e) Communication to radio and radio direction-finder requirements are as follows:

(1) Vessels equipped with a radio installation shall be provided with an efficient means of communication between the radio room and the wheelhouse and one other place, if any, from which the vessel may be steered under normal conditions of navigation, as opposed to other places established for strictly emergency functions.

(i) Where the operating position of the emergency radio installation is not located in the compartment normally used for operating the main radio installation, an efficient means of communication shall be provided between the emergency radio room and the wheelhouse and one other place, if any, from which the vessel may be steered under normal conditions of navigation, as opposed to other places established for strictly emergency functions.

(2) Vessels equipped with radio direction-finding apparatus shall be provided with an efficient means of communication between the navigating bridge and the direction-finding apparatus.

(i) Whenever the direction-finder receiver is located on the navigating bridge of a ship or within any compartment adjoining or opening onto the navigating bridge structure of a ship, the direction-finding apparatus shall be considered as being located on the bridge, and no communication is required.

(3) The communication systems required by this paragraph shall be independent of any other system on the ship, and the location of the termination of these systems shall be subject to approval by the Federal Communications Commission.

§ 113.30–10 *Voice tubes, general requirements.* (a) Voice tubes may be employed to comply with the requirements of this subpart where the required length of voice tube as installed will not exceed 125 feet.

(b) Where the length of voice tube as installed is not over 75 feet, the tube used shall be at least 2 inches outside diameter.

(c) Where the length of voice tube as installed is over 75 feet and not over 125 feet, the tube shall be at least 2½ inches outside diameter.

(d) Sound powered telephone equipment may be installed in all cases where voice tube communication is permitted.

§ 113.30–15 *Voice tubes, detail requirements.* (a) Voice tubes and voice tube fittings shall be constructed of brass or other corrosion-resistant material having a wall thickness of approximately 0.042 inch.

(b) Voice tubing shall be run as direct as possible, and the cross-section of the tube shall be constant throughout the run. Any constriction in the tube such as a dent; reducer coupling, sharp elbow, T connection, or any flat surface shall be avoided. Flexible tubes or bends shall be used in place of fittings wherever possible. Joints in tubing shall be protected by a close fitting sleeve and the joint soldered or filled with white lead.

(c) Voice tubes shall be supported at least every 8 feet on straight runs and at bends as required.

(d) Voice tubes shall be protected where liable to injury and shall not be run in bunkers, cargo spaces, or through machinery spaces unless unavoidable.

(e) Voice tubes shall be provided with drain plugs at the bottom of each vertical run and at all other places where water can collect.

(f) Each voice tube shall be terminated at each end by a suitable mouthpiece with hinged covers and with whistle indicator in the side of the mouthpiece.

(g) All voice tubes shall be provided with designating nameplates.

§ 113.30–20 *Sound powered telephone system, general requirements.* (a) Where a voice tube installation would require a length of tube exceeding 125 feet or where for other reasons efficient communication cannot be obtained by a voice tube installation, approved sound powered telephone equipment shall be installed as the means of communication required by this subpart.

(b) A sound powered telephone system may be extended to cover other locations which are necessary or desirable provided the communication required by this subpart is not interfered with.

(c) Sound powered telephone systems may, in all cases, be installed in lieu of voice tube systems.

§ 113.30–25 *Sound powered telephone system, detail requirements.* (a) Sound powered telephone equipment shall be of a type approved by the Commandant.

(b) Sound powered telephone stations installed in locations exposed to the weather shall be of watertight construction, and the audible signal shall be mounted external to the station enclosure.

(c) Sound powered telephone stations installed in wheelhouse or machinery spaces shall be of at least drip-proof construction.

(d) In noisy locations, a telephone booth or other suitable auxiliary equipment shall be provided if necessary in order that a telephone conversation can be carried on while the vessel is being navigated.

(e) In noisy locations where the magneto-operated telephone station sound signal cannot be heard throughout the space, the sound signal shall be supplemented by an additional sound signal energized from the vessel's electrical system and magneto actuated. This supplementary sound signal shall not be combined with any other signal or alarm system, such as an engineers' signal and alarm panel.

(f) When two or more telephone stations are located in close proximity to each other, a suitable means shall be provided to indicate the station called.

(g) The sound powered telephone talking circuit shall be electrically independent of the calling circuits. A short circuit, open circuit, or ground on either side of the calling circuit shall not affect the talking circuit in any way. All circuits shall be insulated from ground.

(h) Sound powered telephone circuits shall be run in leaded and armored or impervious sheathed and armored cable. All connection boxes employed shall be watertight.

(i) Telephone cables shall be run as close to the fore and aft centerline of the vessel as is practicable.

§ 113.30–90 *Sound powered telephone and voice tube systems for existing vessels.* (a) Vessels contracted for prior to November 19, 1952, shall meet the requirements contained in this section.

(b) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(c) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.35—ENGINE ORDER TELEGRAPH SYSTEMS

§ 113.35–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.35–90, shall apply to all vessels contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 113.35–90.

§ 113.35–5 *General requirements.* (a) All vessels, except as otherwise provided for in this section, shall have installed an efficient means of transmitting engine orders from the wheelhouse to the engine room and of transmitting acknowledgment of engine orders from the engine room to the wheelhouse.

(1) On vessels with more than one propulsion engine, this efficient means of transmitting engine orders shall be provided for each engine.

(2) On double-ended vessels with two wheelhouses, this efficient means of transmitting engine orders shall be provided between the engine room and each wheelhouse.

(3) On vessels provided with a means of steering from the top of the wheelhouse as well as from the wheelhouse, this efficient means of transmitting engine orders shall also be provided between the engine room and the top of the wheelhouse.

(b) The efficient means of transmitting engine orders may be of the engine gong and sound tube type, the mechanical engine order telegraph type, the electric engine order telegraph type, or other types as may be approved.

(c) Small vessels on which the propulsion plant is controlled entirely from the wheelhouse with no means of normal engine control from the engine room, need not be provided with an engine order telegraph system between the wheelhouse and the engine room.

§ 113.35–10 *Engine gong systems, general requirements.* (a) An engine gong system shall consist of pull handles located in the wheelhouse mechanically connected by wires and chains to gongs located in the engine room.

(1) A sound tube of proper size shall be run between the wheelhouse and the engine room and so arranged as to return the sound of the gong signals to the wheelhouse.

(2) A speaking tube or other device for the purpose of conversation between the wheelhouse and the engine room shall also be provided.

(b) The sound tube and the speaking tube shall comply with the requirements of § 113.30–15 except that the sound tube shall be terminated by a flared sounder in lieu of whistle mouthpieces and the sound tube size shall be not less than 2½ inches outside diameter.

(c) The engine room gong and the termination of the sound tube and the speaking tube in the engine room shall be at the engine control station.

(d) The gong pull installation shall comply with the applicable requirements of § 113.35–25.

§ 113.35–15 *Engine gong systems, application.* (a) Engine gong systems shall not be employed on vessels where the length of sound tube as installed will exceed 40 feet.

§ 113.35–20 *Mechanical engine order telegraph systems, general requirements.* (a) Mechanical engine order telegraph systems shall consist of transmitters and indicators mechanically connected to each other by means of chains and wires.

(b) Transmitters and indicators shall be provided with dials divided into sectors or divisions with the various engine orders engraved thereon.

(c) Rotation of the transmitter handle and its associated pointer shall drive the indicator pointer in synchronism. The indicator pointer, always having the same angular position as the transmitter handle and its associated pointer, shall point to the order corresponding to the order on the transmitter.

(d) The engine room indicator shall be equipped with a reply handle and associated pointer driving a reply pointer in the wheelhouse transmitter for acknowledgement of orders.

(e) Each transmitter and each indicator shall be provided with an audible signal device to indicate, in the case of an indicator, the receipt of an order and, in the case of a transmitter, the acknowledgement of an order. The audible signal device shall not be dependent upon any source of power for operation other than that of the movement of the transmitter or indicator handle.

(f) The dials of transmitter instruments shall be illuminated in such a manner as not to interfere with navigating the vessel at night.

(g) Transmitter and indicator operating handles shall be of substantial size so that engine orders may be determined from a distance.

§ 113.35–25 *Mechanical engine order telegraph systems, detail requirements.* (a) Telegraph wire shall be No. 10 Stubs Gage (0.134 inch diameter) soft brass wire and shall be stretched approximately 20 percent before installation.

(b) Pulleys shall be provided wherever a bend in the run of the telegraph wire is made, and at each pulley sheave a length of brass telegraph chain shall be employed.

(c) Pulleys shall be in line with the wire and chain.

(d) Turnbuckles shall be provided in each lead at each instrument to adjust the handles and pointers to the central position of the order, and shall be provided at other locations throughout the system as necessary to take up slack in the lead wires and to center the chains at the pulleys.

(e) Where telegraph leads pass through watertight decks or bulkheads, stuffing tubes shall be employed.

(f) On long horizontal runs, the telegraph wire shall be supported on roller bearers at approximately every 5 feet of run. When telegraph leads are run behind sheathing or when subject to mechanical damage, the leads shall be run "in pipe."

(g) All fittings used in telegraph installations shall be constructed of brass, bronze, or other corrosion-resistant materials.

(h) Positive locking devices, such as keys, shall be used in securing handles and similar parts to their associated shafts to ensure continuous operation of the shaft in response to movement of the handle.

(i) Transmitter dials shall be arranged with the "STOP" order at the top vertical position of the operating handle. On ahead orders the operating handle shall be moved toward the bow of the vessel and on astern orders the operating handle shall be moved toward the stern of the vessel.

(j) Indicator dials shall be arranged as specified for transmitter dials except that the "STOP" order shall be at the bottom vertical position of the reply handle.

(l) Indicator dials on double-ended vessels shall not be marked with the designations "AHEAD" and "ASTERN," but the reply handle and indicator arrow shall point in the direction in which it is desired that the engine operate.

§ 113.35–30 *Mechanical engine order telegraph systems, operation.* (a) Where more than one transmitter, located in the wheelhouse, the wings of the navigating bridge, and/or the top of the wheelhouse, operate a common indicator in the engine room, all the transmitters shall be mechanically interlocked and operate in synchronism. The method of mechanical interlocking shall be such that a failure of the transmission wire or chain at any transmitter located topside will not interrupt or disable other topside transmitters.

§ 113.35–35 *Mechanical engine order telegraph systems, application.* (a) Mechanical engine order telegraph systems may be installed on all vessels to provide the communication required by this subpart where the length of cables or other mechanical limitations will not prevent the efficient operation of the system.

§ 113.35–40 *Electric engine order telegraph systems, general requirements.* (a) Electric engine order telegraph systems shall consist of transmitters and indicators electrically connected to each other.

(b) Transmitters and indicators shall be provided with dials divided into sectors or divisions with the various engine orders engraved thereon.

(c) Rotation of the transmitter handle and its associated pointer shall drive the indicator pointer in synchronism. The indicator pointer, always having the same angular position as the transmitter handle, shall point to the order corresponding to the order on the transmitter.

(d) For acknowledgement of orders, the engine room indicator shall be

equipped with a handle and generator actuating a motor and pointer on the transmitter, similar to the facilities provided for transmitting orders.

(e) Audible signals associated with the system shall consist of a vibrating bell at each instrument. The vibrating bell at both transmitter and indicator shall ring continuously at all times when the transmitter arrow and the reply arrow do not point to the same order.

(f) The dials of transmitter instruments shall be illuminated in such a manner as not to interfere with navigating the vessel at night.

(g) Transmitter and indicator operating handles shall be of substantial size so that the engine order may be determined from a distance.

§ 113.35–45 *Electric engine order telegraph systems, detail requirements.* (a) Telegraph instruments shall form watertight enclosures for the electrical components.

(b) Materials used in the construction of telegraph instruments shall be corrosion-resistant.

(c) Transmitter dials shall be in accordance with § 113.35–25 (i). Indicator dials shall be in accordance with § 113.35–25 (j) except that the "STOP" order may be at the bottom or top vertical position of the reply handle to suit bulkhead or pedestal mounted instruments, respectively.

(d) Electric cable used in conjunction with electric telegraphs shall be leaded and armored or impervious sheathed and armored and all connection boxes shall be of watertight construction.

(e) Each system shall be provided with an alarm device which automatically sounds audibly and indicates visually in the event of loss of potential to the system.

(1) This alarm device shall be located in the wheelhouse.

(2) Means shall be provided to silence the audible signal.

(i) Where the supervisory power supply is a dry cell battery or some other low capacity source, there shall be no electric drain on the supervisory power supply after the audible signal has been silenced; the visible indication may be extinguished to effect this. Upon reestablishment of potential to the telegraph system, the audible signal shall sound again until the alarm circuit is returned to normal unless restoration of this alarm circuit is effected automatically.

§ 113.35–50 *Electric engine order telegraph system, operation.* (a) Where more than one transmitter, located in the wheelhouse, the wings of the navigating bridge, and/or the top of the wheelhouse, operate a common indicator in the engine room, all the transmitters shall operate in synchronism. This requirement shall be applicable both to the transmitters handles and pointers and to the reply pointers. The method of interlocking if employed, shall comply with § 113.35–30 (a).

(b) Where compliance with paragraph (a) of this section is not reasonable nor practicable, a transmitter transfer control system may be employed. The transmitter transfer control system shall be arranged so that operation of a transmitter handle of one of the transmitters automatically connects that instrument electrically to the engine room indicator and simultaneously disconnects electrically the other transmitters. The reply pointers of all transmitters shall operate in synchronism at all itmes.

§ 113.35–55 *Electric engine order telegraph systems, application.* (a) Electric engine order telegraph systems may be installed on all vessels to provide the communication required by this subpart, except that passenger vessels of 20,000 gross tons or over equipped with an electric engine order telegraph system shall be provided with a stand-by system, either electrical or mechanical.

§ 113.35–90 *Engine order telegraph systems for existing vessels.* (a) The engine order telegraph installations on vessels contracted for prior to November 19, 1952, shall meet the requirements in this section.

(b) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(c) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.40—RUDDER ANGLE INDICATOR SYSTEMS

§ 113.40–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.40–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 113.40–90.

§ 113.40–5 *General requirements.* (a) Vessels of 5,000 gross tons or over, or vessels of any tonnage certificated to carry 250 passengers or more, shall be provided with a system, either electrical or mechanical, for indicating at each power steering station the position of the rudder.

§ 113.40–10 *Detail requirements.* (a) The rudder angle indicator system shall consist of a transmitter located at the rudder head and actuated by movement of the rudder, the angular movements of the rudder being transmitted to a remote indicator(s).

(b) The indicator instrument shall consist of a fixed dial with angular positions of the rudder right and left of an amidship position indicated thereon. Indications of rudder angle shall be by means of a moving pointer.

(1) The movement of the indicator pointer shall be consistent with the movement of the steering wheel or control.

(c) The indicator(s) shall be located in direct line of vision of the helmsman and shall be provided with dial illumination in such a manner as not to interfere with navigating the vessel at night.

(d) The method of transmitting rudder movement between the transmitter and the indicator(s) may be either by self-synchronous generator and motor(s), by mechanical telegraphs, or by other equivalent means.

(e) The electric rudder angle indicator system shall comply with the applicable requirements of §§ 113.35–40 and 113.35–45.

(f) Mechanical methods of transmitting rudder angles shall be in accordance with approved installation drawings submitted for each installation.

§ 113.40–90 *Rudder angle indicator systems for existing vessels.* (a) Rudder angle indicator systems on vessels contracted for prior to November 19, 1952, shall meet the requirements in this section.

(b) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(c) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.45—REFRIGERATED SPACES ALARM SYSTEMS

§ 113.45–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.45–90, shall apply to all vessels contracted for on or after November 19, 1952. The provisions of § 113.45–90 shall apply to all vessels contracted for prior to November 19, 1952.

§ 113.45–5 *General requirements.* (a) Each refrigerated space accessible to ship's personnel during a voyage and which can be so locked from the outside that it cannot be opened from the inside, shall be fitted with an alarm system operated from within each refrigerated space.

(b) The alarm system may be either a mechanical pull operating a jingle bell or an electrical push button operating a vibrating bell or other audible device.

(c) The mechanical pull or electrical push button shall be located at the exit from the refrigerated compartment.

(d) The audible signal shall be located where a person is regularly employed.

(e) Where a common audible signal is provided for more than one lockable refrigerated compartment, an annunciator shall be provided to locate the compartment from which the signal was initiated.

§ 113.45–90 *Refrigerated spaces alarm systems on existing vessels.* (a) Refrigerated spaces alarm systems on vessels contracted for prior to November 19, 1952, shall meet the requirements in this section.

(b) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(c) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.50—EMERGENCY LOUDSPEAKER SYSTEM

§ 113.50–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.50–90, shall apply to all ocean and coastwise passenger vessels contracted for on or after November 19, 1952. Ocean and coastwise vessels contracted for prior to November 19, 1952, shall meet the requirements of § 113.50–90.

§ 113.50–5 *General requirements.* (a) All ocean and coastwise passenger vessels certificated to carry 500 or more persons, including officers and crew, and/or all passenger vessels whose lifeboats are stowed more than 100 feet from the navigating bridge, shall be equipped with an approved loudspeaker system which will enable an officer on the bridge to broadcast separately or collectively to the stations listed in this paragraph.

(1) Lifeboat stations, port.

(2) Lifeboat stations, starboard.

(3) Lifeboat embarkation stations, port.

(4) Lifeboat embarkation stations, starboard.

(5) Public spaces used for passenger assembly stations.

(6) Crew quarters.

(b) The system shall be controlled from a single location on the navigating bridge.

(c) Loudspeakers, as designated by the Commandant, at lifeboat and embarkation stations shall be arranged for two-way conversation with the navigating bridge.

(d) The emergency loudspeaker system shall be of a type approved by the Commandant.

§ 113.50–10 *Power supply.* (a) The loudspeaker system shall be energized from the source of emergency lighting and power as required by Subpart 112.15 of this subchapter.

(b) Where the loudspeaker system requires a power supply of a character different from that available from the temporary source of emergency lighting and power, conversion equipment as required by Subpart 112.40 of this subchapter shall be provided.

§ 113.50–15 *Location of loudspeakers*—(a) *General.* (1) Loudspeakers shall be located with due regard to the intended service and to minimize as much as possible the effect of feedback and other interference.

(2) In general, loudspeakers on open decks shall be directed toward the after end of the vessel and outboard by an angle of approximately 15 degrees.

(b) *Boat deck loudspeakers.* (1) A loudspeaker shall be located at each lifeboat handling station. The axis of the loudspeaker shall be directed aft and outboard in such a manner that the sound level at the lifeboat handling station will be not less than the levels given in Table 113.50–15.

(c) *Lifeboat embarkation and passenger assembly station loudspeakers.* (1) Loudspeakers shall be distributed throughout the lifeboat embarkation deck and locations designated by the vessel's station bill for the assembly of passengers in an emergency, in such number as to provide an even distribution of sound at a level not less than that specified in Table 113.50–15. An even distribution of sound level is considered satisfied if the variation does not exceed plus or minus 3 decibels.

(d) *Crew quarters' loudspeakers.* (1) Loudspeakers shall be distributed in passageways throughout crew quarters in such number as to provide a sound level not less than that specified in Table 113.50–15 in each room with the doors closed.

TABLE 113.50–15—MINIMUM SOUND LEVEL REQUIREMENTS FOR LOUDSPEAKER SYSTEMS

[All data given in decibels]

Location	Ground noise level, minimum	Signal level		Voice level	
		Above ground noise	Total	Above ground noise	Total
Lifeboat stations. Embarkation deck and exterior passenger assembly points	80	20	[1] 100	15	[1] 95
Interior passenger assembly points	75	20	[1] 95	15	[1] 90
Crew quarters	60	18	[2] 78	12	[2] 72

[1] Measured at a distance of 10 feet from the loudspeaker and on the axis thereof.

[2] Measured in rooms with the doors to the passageways closed.

§ 113.50–20 *Distribution of cable runs.* (a) Cable runs to the different loudspeaker groups shall be as widely separated from each other as possible to limit the extent of damage to the system from a single casualty. In addition, the distribution shall be such that a casualty to the port or starboard supplies to loudspeakers on boat and embarkation decks will render not more than half of the loudspeakers in the group inoperative. This may be accomplished by feeding the loudspeakers of a particular group alternately from a port and starboard multiconductor cable.

(b) Cable runs shall, where possible, be located in passageways and shall avoid staterooms, lockers, and other enclosed spaces.

§ 113.50–25 *Type of cable and equipment enclosures.* (a) All cable used in connection with the system shall be lighting and power or interior communication cable, either leaded and armored or impervious sheathed and armored.

(b) All junction or connection boxes employed in the distribution system shall be of watertight construction.

§ 113.50–30 *Shipboard tests.* (a) The operation of the system shall be observed to determine that voice reproduction is of good quality and intelligibility of a high order.

(b) Sound levels shall be measured with a sound level meter to demonstrate that the levels listed in Table 113.50–15 are met.

(1) Where the ground noise level with the vessel under way in moderate weather is in excess of the values listed in Table 113.50–15, the signal and voice levels shall be increased correspondingly so that the differential between ground noise level and the signal and voice levels shall be not less than the differential given in this table.

(c) It shall be demonstrated that grounding either conductor or "shorting" both conductors to any one lifeboat station loudspeaker, or to an embarkation deck loudspeaker, will not reduce the output of any one of the remaining loudspeakers by more than 3 decibels.

§ 113.50–35 *Operation of emergency loudspeaker systems.* (a) The emergency loudspeaker system shall be used at the discretion of the master and shall function entirely independently of any public address or music distribution system.

(b) The emergency loudspeaker system shall not be used for entertainment purposes.

(c) The complete emergency loudspeaker system shall be given an operating test at least once every week. These tests shall be made by a licensed officer and the condition of the equipment entered in the vessel's log.

(d) When a vessel is equipped with a public address or music distribution system, means shall be provided adjacent to the emergency loudspeaker system control panel to silence the public address or music distribution systems.

§ 113.50–90 *Emergency loudspeaker systems for existing vessels*—(a) *Existing vessels.* Emergency loudspeaker systems on ocean and coastwise passenger vessels contracted for prior to November 19, 1952, shall meet the requirements of this section.

(b) *General requirements.* (1) All passenger vessels the construction of which was begun prior to January 1, 1937, on which lifeboats are stowed more than 100 feet from the navigating bridge, and all passenger vessels the construction of which was begun prior to November 19, 1952, but on and after January 1, 1937, certificated to carry 1,000 persons or more, including officers and crew, shall be equipped with a loudspeaker system which shall enable an officer on the bridge to broadcast separately or collectively to the stations listed in this subparagraph.

(i) Lifeboat stations, port and starboard. (The deck or decks on which lifeboats are stowed and from which they are launched.)

(ii) Embarkation deck, port and starboard. (The deck or decks, designated by construction design or by the vessel's station bill, used for the embarkation of passengers and crew into lifeboats. If lifeboat stations are used for embarkation purposes, this requirement will be omitted.)

(iii) Main quarters for crew. (The quarters of the emergency squad, deck crew, and stewards assigned to passenger quarters.)

(iv) Public spaces. (The spaces designated by the vessel's station bill where passengers and crew are to assemble in an emergency.)

(2) The Commandant may, in special cases, exempt passenger vessels the con-

struction of which was begun prior to January 1, 1937, having a small number of especially accessible lifeboats stowed more than 100 feet from the bridge: *Provided, however,* That no such vessel certificated to carry more than 200 persons, including officers and crew, shall be so exempted.

(3) Details of the system shall be in general agreement with §§ 113.50–5 through 113.50–35 insofar as is reasonable and practicable.

(4) Existing arrangements, materials, and facilities previously approved, but not meeting the applicable specifications or requirements set forth in §§ 113.50–5 through 113.50–35, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation provided that, in no case, will a greater departure from the standards of §§113.50–5 through 113.50–35 be permitted than presently exist. All new installations or major replacements shall meet the applicable specifications or requirements, for new vessels.

SUBPART 113.55—NAVIGATION LIGHTS

§ 113.55–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.55–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 113.55–90.

§ 113.55–5 *General requirements.* (a) The general requirements for navigation lights are contained in Part 25 of Subchapter C (Uninspected Vessels), Part 77 of Subchapter H (Passenger Vessels), and Part 96 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

§ 113.55–10 *Construction of navigation lights.* (a) Navigation lights shall be of an approved type.

§ 113.55–15 *Installation of navigation lights.* (a) Navigation lights shall be installed in such a manner that the angles of visibility and the minimum heights above the deck required by the applicable Pilot Rules will be assured.

(b) The light from a navigation light shall not be obscured by any part of the vessel's structure or rigging.

(c) Navigation lights shall be wired, by means of a short length of heavy duty portable cable to a watertight receptacle outlet located adjacent thereto. Where the double lens, two-lamp type electric navigation light is installed, each lamp shall be connected to its branch circuit conductors by means of a separate receptacle outlet as indicated in Figure 113.55–25 (b).

§ 113.55–20 *Light screens.* (a) Light screens required by the Pilot Rules for port and starboard side lights shall be painted with a glossy black paint and shall project not less than three feet forward of the center of the light source.

§ 113.55–25 *Navigation light indicator panel.* (a) Vessels of 1,600 gross tons and over shall be provided with a navigation light indicator panel located in the wheelhouse to control electric side, masthead, range, and stern lights. The panel shall provide visible and audible indications of the failure of any of the above named navigation lights.

(b) Recommended circuit diagrams for navigation light indicator panels are shown in Figure 113.55–25 (b). Other circuit diagrams may be submitted for approval.

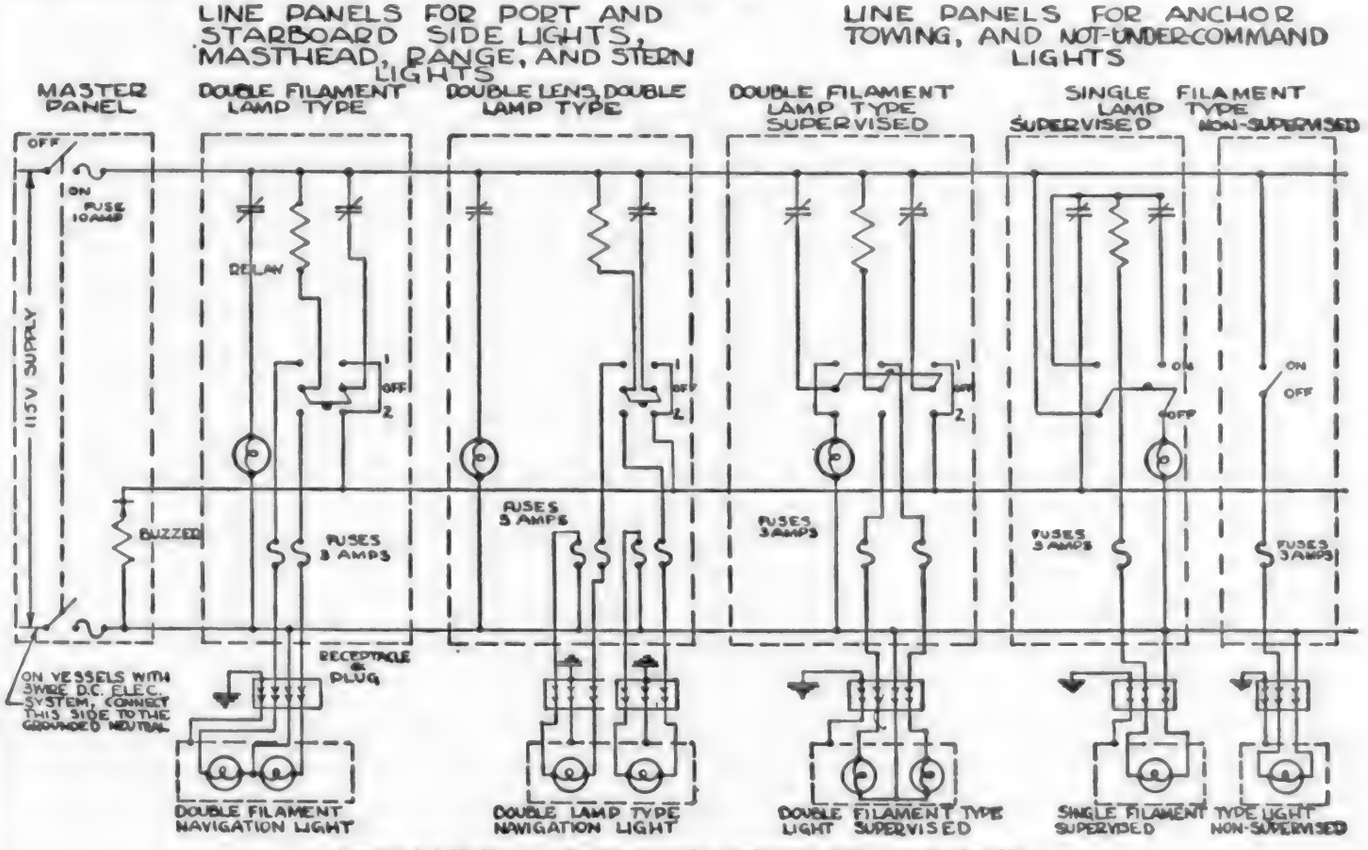

LINE PANELS FOR PORT AND STARBOARD SIDE LIGHTS, MASTHEAD, RANGE, AND STERN LIGHTS
LINE PANELS FOR ANCHOR TOWING, AND NOT-UNDER-COMMAND LIGHTS
MASTER PANEL
DOUBLE FILAMENT LAMP TYPE
DOUBLE LENS, DOUBLE LAMP TYPE
DOUBLE FILAMENT LAMP TYPE SUPERVISED
SINGLE FILAMENT LAMP TYPE SUPERVISED
SINGLE FILAMENT TYPE NON-SUPERVISED
OFF
ON
FUSE 10 AMP
115V SUPPLY
RELAY
BUZZER
FUSES 3 AMPS
FUSES 5 AMPS
RECEPTACLE & PLUG
ON VESSELS WITH 3 WIRE D.C. ELEC. SYSTEM, CONNECT THIS SIDE TO THE GROUNDED NEUTRAL
DOUBLE FILAMENT NAVIGATION LIGHT
DOUBLE LAMP TYPE NAVIGATION LIGHT
DOUBLE FILAMENT TYPE LIGHT SUPERVISED
SINGLE FILAMENT SUPERVISED
SINGLE FILAMENT TYPE LIGHT NON-SUPERVISED

FIGURE 113.55–25 (b)—Semiautomatic navigation light panel circuits.

§ 113.55–90 *Navigation lights for existing vessels.* (a) Navigation lights on vessels contracted for prior to November 19, 1952, shall meet the requirements covered in this section.

(b) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Office in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(c) All new installations or major replacements shall meet the applicable specifications or requirements.

SUBPART 113.60—SIGNALING LIGHTS

§ 113.60–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.60–90, shall apply to vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 113.60–90.

§ 113.60–5 *General requirements.* (a) All vessels of over 150 gross tons, when engaged in international voyages, shall be equipped with an efficient daylight signaling light of the type covered by this subpart.

§113.60–10 *Detail requirements.* (a) The signaling light shall consist of a device which produces a narrow high-intensity beam of light suitable for daylight blinker communication at speeds up to 9 words (180 dots and/or dashes) per minute.

(b) The axial candlepower of the beam shall be not less than 60,000 candlepower. The beam shall have a total horizontal and vertical divergence of approximately 6 degrees. This divergence is defined as the angular limits of the beam where the candlepower has fallen to one-tenth of the axial candlepower.

(c) In addition to the requirements of paragraph (b) of this section, the candlepower of the beam in every direction within an angle of 0.7 degree from the axial shall be not less than 50 percent of the axial candlepower.

(d) The signaling light shall be fitted with a suitable sighting arrangement capable of directing the beam on to the receiving station.

(e) Signaling may be effected by keying the current through the lamp, by movement of shutters, or by other approved means.

(f) The signaling light may be either a fixed unit mounted on the top of the wheelhouse, a semi-fixed unit with arrangements for quick mounting at either wing of the navigating bridge, or a portable unit.

(g) Fixed or semifixed signaling lights shall be energized from the emergency lighting and power system as required by § 112.15–5 (e) of this subchapter. Portable signaling units shall be energized from a self-contained storage battery capable of operating the unit 2 hours continuously without recharging.

§ 113.60–90 *Signaling light for existing vessels.* (a) Signaling lights on vessels contracted for prior to November 19, 1952, shall meet the requirements in this section.

(b) Ocean and coastwise ships over 150 gross tons shall be equipped with an efficient signaling lamp. This lamp shall be permanently fixed above the bridge and equipped with a Fresnel lens and high-speed bulb, operated by a weatherproof key, fitted with a suitable condenser. The lamp shall be so connected that it can be operated from the normal source of ship's current, the emergency source, and other emergency batteries if provided.

(c) Existing arrangements, materials, and facilities previously approved will be considered satisfactory as long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation. All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.65—WHISTLE OPERATORS

§ 113.65–1 *Application.* (a) The provisions of this subpart, with the exception of § 113.65–90, shall apply to all vessels contracted for on or after November 19, 1952. Vessels contracted for prior to November 19, 1952, shall meet the requirements of § 113.65–90.

§ 113.65–5 *General requirements.* (a) The general requirements for whistles, sirens, and fog horns are contained in Part 26 of Subchapter C (Uninspected Vessels), Part 77 of Subchapter H (Passenger Vessels), and Part 96 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

(b) The mechanical whistle or siren pull leads shall be as direct as possible and amply protected. When the leads are suspended for more than 15 feet, they should be supported from a corrosion-resistant cable with suitable bearers. The system shall be provided with ample corrosion-resistant springs to relieve all weight on the lever and for the proper functioning of the system.

(c) Materials and mechanical details shall be in general accordance with the requirements for mechanical telegraphs given in § 113.35–25.

(d) When electrically operated whistles and sirens are installed, all parts shall be independent of the mechanical system.

(e) When electrically operated valves for whistles or sirens are located more than 5 feet from the whistle, an automatic drain feature for the steam whistle pipe shall be installed.

(f) The supply for an electrically operated whistle or siren shall be from the emergency lighting and power system as required by Part 112 of this chapter.

§ 113.65–90 *Whistle operators for existing vessels.* (a) Whistle operators on vessels contracted for prior to November 19, 1952, shall meet the requirements in this section.

(b) Existing arrangements, materials, and facilities previously approved will be considered satisfactory so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standard as the original installation.

(c) All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

SUBPART 113.70—SMOKE DETECTOR SYSTEMS

§ 113.70–1 *Application.* (a) Where a smoke detector system is installed, the provisions of this subpart, with the exception of § 113.70–90, shall apply to all installations contracted for on or after November 19, 1952. Installations contracted for prior to November 19, 1952, shall meet the requirements of § 113.70–90.

(b) For the vessels on which a smoke detector system is required, see Part 76 of Subchapter H (Passenger Vessels) of this chapter.

§ 113.70–5 *General requirements.* (a) The smoke detector control unit shall be of a type approved by the Commandant.

(b) All electric cable installed in conjunction with the smoke detector system shall be lighting and power or interior communication cable, either leaded and armored or impervious sheathed and armored.

(c) Cable runs between the smoke detector control unit and the supply switchboard shall be as direct as possible and shall avoid staterooms, lockers, and other enclosed spaces where the cable could be damaged by a localized fire or by other causes.

§ 113.70–10 *Power supply.* (a) On vessels fitted with an automatically started emergency lighting and power system, the smoke detector system shall be supplied by duplicate branch circuits from the emergency switchboard. On vessels fitted with a temporary source of emergency lighting and power, the duplicate branch circuits shall be connected to the temporary emergency source of supply.

(b) On vessels not fitted with an automatically started emergency lighting and power system, the smoke detector system shall be supplied from sources as directed by the Commandant.

§ 113.70–90 *Equipment and installations on vessels contracted for prior to November 19, 1952.* (a) Existing arrangements, materials, and facilities previously approved, but not meeting the applicable specifications or requirements set forth in §§ 113.70–5 and 113.70–10, may be continued in service so long as they are maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection. Minor repairs and minor alterations may be made to the same standards as the original installation: *Provided,* That, in no case, will a greater departure from the standards of §§ 113.70–5 and 113.70–10 be permitted than presently exist. All new installations or major replacements shall meet the applicable specifications or requirements for new vessels.

PART 114—FIRE APPARATUS, FIRE PREVENTION

Part 114 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 115—SPECIAL OPERATING REQUIREMENTS

Part 115 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 116—INSPECTION OF VESSELS

Part 116 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 117—FERRYBOATS

Part 117 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 118—EXCURSION STEAMERS

Part 118 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 119—BARGES

Part 119 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 120—DUTIES OF INSPECTORS

Part 120 is canceled.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

SUBCHAPTER K—MARINE INVESTIGATIONS AND SUSPENSION AND REVOCATION PROCEEDINGS

The title for Subchapter K is changed from "Seamen" to "Marine Investigations and Suspension and Revocation Proceedings."

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

PART 131—HOURS OF LABOR ON SHIPBOARD

Part 131 is canceled. (The text of these regulations has been transferred to Part 157 of this chapter.)

(Sec. 7, 49 Stat. 1936, 46 U. S. C. 689)

PART 133—DESIGNATION AND APPROVAL OF NAUTICAL SCHOOL SHIPS; RULES FOR CONDUCT OF SCHOOL SHIPS

Part 133 is canceled. (The text of §§ 133.0 to 133.4, inclusive, has been transferred to Part 166 of this chapter, and the text of §§ 133.5 to 133.18, inclusive, has been transferred to Part 168 of this chapter.)

(Sec. 13, 38 Stat. 1169, as amended, sec. 3, 54 Stat. 346, as amended; 46 U. S. C. 672, 1333)

PART 134—UNITED STATES SHIPPING COMMISSIONERS

Part 134 is canceled. (The text of these regulations has been transferred to Part 16 of this chapter.)

(Sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 689)

PART 135—LANGUAGE TEST FOR SEAMEN

Part 135 is canceled. (The text of these regulations has been transferred to Part 157 of this chapter.)

(Sec. 13, 38 Stat. 1169, as amended; 46 U. S. C. 672)

PART 136—MARINE INVESTIGATION REGULATIONS

SUBPART 136.05—NOTICE OF MARINE CASUALTY AND VOYAGE RECORDS

1. Section 136.05–1 (e) is amended to read as follows:

§ 136.05–1 *Notice of marine casualty.* * * *

(e) Injury causing any persons to remain incapacitated for a period in excess of 72 hours; except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4450, as amended, secs. 1, 2, 49 Stat. 1544, sec. 5, 55 Stat. 244, as amended; 46 U. S. C. 239, 367, 50 U. S. C. App. 1275)

2. Part 136 is amended by adding a new § 136.05–25 reading as follows:

§ 136.05–25 *Reports when state of war exists.* During the period when a state of war exists between the United States and any foreign nation, communications in regard to casualties or accidents shall be handled with caution and the reports shall not be made by radio or by telegram.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4450, as amended, secs. 1, 2, 49 Stat. 1544, sec. 5, 55 Stat. 244, as amended; 46 U. S. C. 239, 367, 50 U. S. C. App. 1275)

PART 140—ABLE SEAMEN

Part 140 is canceled. (The text of these regulations has been transferred to Part 157 of this chapter.)

(Sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 689)

PART 141—MANNING OF INSPECTED VESSELS

Part 141 is canceled. (The text of these regulations has been transferred to Part 157 of this chapter.)

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subchapter M—Bulk Grain Cargoes

The title for Subchapter M is changed from "Construction or Material Alteration of Passenger Vessels of the United States of 100 Gross Tons and Over Propelled by Machinery" to "Bulk Grain Cargoes"; the title for Part 144 is changed from "Construction or Material Alteration of Passenger Vessels of the United States of 100 Gross Tons and Over Propelled by Machinery" to "Loading and Stowage of Grain Cargoes"; and Part 144 is amended to read as follows:

PART 144—LOADING AND STOWAGE OF GRAIN CARGOES

SUBPART 144.01—PREFACE

Sec.
144.01–1 Purpose.

SUBPART 144.10—GENERAL REQUIREMENTS

144.10–1 Scope.
144.10–10 Application to vessels.
144.10–20 Definitions.
144.10–25 Certification by National Cargo Bureau, Inc.
144.10–30 Shifting boards.
144.10–40 Uprights.
144.10–50 Shores.
144.10–60 Stays.
144.10–70 Feeders, bins, and bulkheads.
144.10–80 Security of hatches.
144.10–90 Equivalents.

SUBPART 144.20—DETAILED LOADING AND STOWAGE REQUIREMENTS

144.20–1 Bagged grain.
144.20–10 Holds or compartments partly filled with loose grain in bulk.
144.20–20 Holds or compartments entirely filled with loose grain in bulk.
144.20–30 Location of stowage for light grain in bulk.
144.20–40 Location of stowage for heavy grain in bulk.

SUBPART 144.30—VESSELS SHIFTING PORTS

144.30–1 Shifting vessels with part cargoes of loose grain in bulk.

AUTHORITY: §§ 144.01–1 to 144.30–1, issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417, as amended, sec. 1, 49 Stat. 1544, as amended, sec. 5, 55 Stat. 244, 245; 46 U. S. C. 391, 367, 50 U. S. C. App. 1275.

SUBPART 144.01—PREFACE

§ 144.01–1 *Purpose.* (a) The purpose of the regulations in this subchapter is to promote safety in the handling, stowage and transportation of grain on board vessels within the limits of the jurisdiction of the United States, including its territories and possessions excepting only the Panama Canal Zone, and to make more effective the provisions of the International Convention for the Safety of Life at Sea, 1948, relative to the carriage of grain.

SUBPART 144.10—GENERAL REQUIREMENTS

§ 144.10–1 *Scope.* (a) The regulations in this part contain the minimum requirements for the handling, stowage, and transportation of loose grain in bulk on board vessels.

§ 144.10–10 *Application to vessels.* (a) The regulations in this part apply to every passenger vessel and every cargo vessel of 500 gross tons or over when carrying loose grain in bulk as cargo on an international voyage (excepting the Great Lakes).

§ 144.10–20 *Definitions.* (a) For the purpose of the regulations in this part the definitions in this section shall apply.

(b) "Grain" shall include wheat, maize (corn), oats, rye, barley, rice, pulses, and seeds.

(c) "Light grain" means oats, light barley or cottonseed.

(d) "Light barley" means barley which weighs:

(1) 50 pounds or under per full bushel of 1.2445 cubic feet (U. S. A.); or,

(2) 51.575 pounds or under per full bushel of 1.2837 cubic feet (U. K.).

(e) "Heavy grain" means all grain other than oats, light barley, or cottonseed.

(f) "Bin" means a section of the cargo space in the 'tween decks or superstructure completely enclosed on all sides.

§ 144.10–25 *Certification by National Cargo Bureau, Inc.* (a) Certificates of loading of the National Cargo Bureau, Inc., may be accepted as prima facie evidence of compliance with the requirements in this subchapter.

§ 144.10–30 *Shifting boards.* (a) Shifting boards shall be of good sound timber of minimum thickness of 2 inches, and fitted grain-tight.

(b) The maximum unsupported span to be allowed for shifting boards of various thicknesses shall be as set forth in Table 144.10–30 (b).

TABLE 144.10–30 (b)

Thickness	Span	Housing of bulkhead
		Inches
2-inch planks	Unsupported span not to exceed 8 feet.	3
2½-inch planks	Unsupported span not to exceed 11 feet.	3
3-inch planks	Unsupported span not to exceed 13 feet.	3

(c) Shifting boards shall be securely housed at bulkheads, and where permanent angle bars are not available for this purpose, wood cants shall be fitted not less than 6 inches in width and 3 inches in thickness and suitably shored.

(d) Where 2½ inch or 3 inch shifting boards are used the boards may be butt-jointed in way of the uprights and at least 4 inches of plank shall be supported. Where 2 inch shifting boards are used the joints shall overlap by at least 9 inches in way of the uprights.

(e) Where no special arrangements are made for grain-tight filling between the beams, wood filling pieces of the same thickness as the shifting boards shall be fitted grain tight between the beams, and shall be secured in place by cleats or scabs at both ends and fitted both sides. The cleats or scabs shall be at least 2 inches by 4 inches and shall extend the full depth of the filling piece and to an equal distance thereunder, and shall be securely spiked or bolted to the shifting boards and filling pieces.

§ 144.10–40 *Uprights.* (a) Uprights shall be of wood or steel.

(b) Wood uprights shall not be less than 10 inches in width and 2 inches in thickness.

(c) Uprights shall be cleated to the tanktop or ceiling where fitted, and when an upright is not securely housed at the top the uppermost supporting shores or stay shall be not more than 18 inches below the deck or top of the upright.

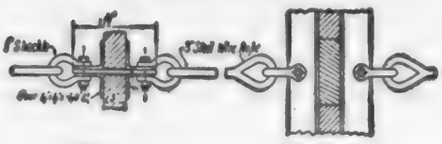
(d) (1) Where a tier of closely spaced pillars in a hold or compartment is utilized for supporting the shifting boards at the middle line, the sizes of the pillars shall be in accordance with the rules of approved classification societies for deck beam pillars.

(2) Where the pillars are not reeled or staggered, additional support shall be provided by means of hook-bolts and vertical tieplates or uprights secured to the pillars. Such tieplates shall consist of plates not less than 3 inches in width and ½ inch in thickness and shall be through-bolted at intervals of not more than 3 feet.

(e) The horizontal distances between the centers of uprights shall be specified in § 170.10–30 (b). Wood uprights used in association with wire stays, spaced as in § 170.10–60, shall be not less than 11 inches in width and 3 inches in thickness.

(f) The construction and dimensions of angle bar uprights used in association with wire stays shall conform to, or be equivalent to, the following:

(1) *Type I.* Each upright shall consist of 4 angle bars 4 by 4 by 0.40 inches and steel plate 11½ inches wide by .50 inch thick riveted to form one complete structure allowing 4-inch housings on both forward and after sides. Equivalent brackets riveted to head and heel shall be fitted, each to take five ⅞-inch bolts with corresponding lugs and/or angles on tank top, tunnel top, and hatch webs. See Figure 144.10–40 (f) (1) for illustration.



— Plan. — — Elevation. —

FIGURE 144.10–4 (f) (1)

(2) *Type II.* Metal uprights in accordance with Table 144.10–40 (f) (2). Vertical angle bars shall be connected at head and heel to the tank top, tunnel top, deck beams, and hatch webs by angle lugs having two ⅞-inch bolts in each angle bar upright and equivalent fastenings to tanktop, tunnel top, deck beams, and hatch webs. The vertical angle bars shall be bolted together through the shifting boards by ⅞-inch bolts not more than 4 feet apart. See figure 144.10–40 (f) (2) for illustration with overlap of shifting boards.

TABLE 144.10–40 (f) (2)

Horizontal distance between centers of uprights	Vertical spans supported by each stay	Sizes of angle bars
	Feet	*Inches*
8' (2" shifting boards)	8	3 x 3 x 0.38
8' (2" shifting boards)	11	3½ x 3½ x 0.38
8' (2" shifting boards)	14	4½ x 3½ x 0.44
11' (2½" shifting boards)	8	3 x 3 x 0.38
11' (2½" shifting boards)	11	4 x 3½ x 0.40
11' (2½" shifting boards)	14	6 x 3½ x 0.40
13' (3" shifting boards)	8	3 x 3 x 0.38
13' (3" shifting boards)	11	4 x 3½ x 0.42
13' (3" shifting boards)	14	6 x 3½ x 0.40

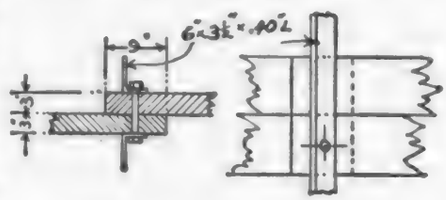


FIGURE 144.10–40 (f) (2).

(g) Wood uprights shall be supported by steel wire rope stays set up at the ship's side, or by wood shores securely heeled against the permanent structure of the ship, or by other approved means.

§ 144.10–50 *Shores.* (a) All wood shores shall be of good sound timber in a single piece. Spliced shores shall not be used.

(b) The vertical spacing of wood shores shall be as follows:

(1) Except as provided in § 144.10–40 (c), the uppermost shore shall be not more than 7 feet below the top of the upright and succeeding shores shall be spaced 7 feet apart measured vertically from the uppermost shore downwards, except that a distance of 8 feet may be allowed between the lowest shore and the heel support.

(2) Shores may be heeled on the tanktop or ceiling provided the heels are secured by cleats or cants and efficiently braced against the permanent structure.

(3) Shores shall not be heeled directly against the ship's side plating.

(c) The sizes of wood shores shall be set forth in Table 144.10–50 (c).

TABLE 144.10–50 (c)

Length of shores	Minimum sizes	
	Rectangular section	Circular section diameter
	Inches	*Inches*
Not exceeding 16 feet	4 x 6	5½
Over 16 feet and not exceeding 20 feet	6 x 6	7
Over 20 feet and not exceeding 24 feet	6 x 8	7½
Over 24 feet and not exceeding 28 feet	[1] 6 x 8	8
Over 28 feet	[1] 6 x 8	8½

[1] Securely bridged at about midlength.

(d) Where the spacings of the shores or uprights are less than those prescribed by §§ 144.10–30 (b) and 144.10–50 (b), the sizes of the shores may be reduced in proportion, and where, in special circumstances, the spacings of the shores or uprights are increased, additional strength shall be provided as may be prescribed by the District Commander of the United States Coast Guard or his authorized representative.

(e) Shores should normally be fitted at an angle not exceeding 10 degrees from the horizontal; where this angle is exceeded the next larger size of shore to that required by its length shall be used. The angle between any shore and the surface to be supported shall not exceed 45 degrees from the horizontal.

§ 144.10–60 *Stays.* (a) Where uprights are secured as approved at both head and heel, one stay on each side of each upright will be accepted in holds 20 feet and under in depth, to be placed at approximately ⅓ of the distance below the deck. Where the hold is more than 20 feet deep, 2 stays on each side of each upright shall be required, the upper stays to be placed at approximately ¼ of the distance below the deck and the lower stays at half the depth of the hold. Depths shall be measured to top of floor, inner bottom or tunnel top.

(b) Where wire stays are used the following provisions shall apply:

(1) The stays shall be of at least 3-inch circumference flexible steel wire rope and shall be fitted horizontally;

(2) The rigging screws shall be at least 1¼-inch diameter and shall be fitted in accessible positions;

(3) The shackles shall be at least 1 inch;

(4) The eye bolts through the wood or angle bar uprights shall be at least 1¼ inches;

(5) At least ⅞-inch screw bolts and nuts shall be provided as may be necessary for securing the wood uprights or steel angle bars;

(6) Eye plates of at least 1 inch thickness shall be securely riveted to the side stringers or frames, or at least 1 inch shackles passed through the frames.

(c) Where in accordance with § 144.20–20 shifting boards do not extend the full depth of the hold, the shifting boards and their uprights shall be supported or stayed as provided for in the regulations in this part or to the satisfaction of the District Commander of the

United States Coast Guard or his authorized representative.

§ 144.10–70 *Feeders, bins, and bulkheads.* (a) Feeders, bins, and bulkheads shall be of sufficient strength to withstand the pressure of the head of grain contained therein and shall be made grain tight. When the height of the 'tween decks is greater than normal, special attention should be given to the stiffening and support of feeders and bins.

(b) Ships having one or more decks with one continuous hold forward or one continuous hold aft with two hatches to each hold shall have a well-constructed bulkhead extending from side to side of the ship between the 2 hatches to divide the space.

(c) Wood feeders and bin bulkheads may be constructed:

(1) Of planks worked vertically not less than 2½-inch thickness, but where the vertical unsupported span exceeds 8 feet the thickness of the planks shall be increased, or additional stiffening fitted; or,

(2) Of studding and lined with grain-tight boards 2 inches in thickness or two 1 inch layers of shiplap, laid horizontally with broken joints. Studding where possible shall be placed inside the hatch coamings and shall be not less than 4 inches by 6 inches on edge spaced not more than 2 feet centers.

(d) Wing feeders may be constructed in a similar manner around trimming hatches. In all cases the planks at the corners shall be well secured to substantial vertical cants.

(e) Where the depth of the hatch end beams or coamings exceeds 15 inches below the surface of the deck, feeding holes shall be provided to allow the grain to flow through the coamings into the hold or 'tween decks; where the depth of the coamings below the surface of the deck exceeds 15 inches and is not more than 18 inches feeding holes 2 inches in diameter shall be provided. Where the depth exceeds 18 inches feeding holes of 3½-inch diameter shall be provided. Feeding holes shall be spaced approximately 2 feet apart.

(f) Engine room, boiler room, stokehold bulkheads and donkey boiler recesses where subjected to heat shall be sheathed with wood and made grain tight. An air space of at least 6 inches shall be left between the bulkhead and the sheathing and a box trunk ventilator 6 inches by 8 inches shall be provided from the top of the air space to a ventilator or hatchway, or other equal and approved means of ventilation adopted. Sheathing shall be supported on vertical runners spaced not more than 2 feet centers and shall consist of 2 inch planks or two thicknesses of 1 inch boards laid to break joint. Other approved means of insulation may be accepted.

§ 144.10–80 *Security of hatches.* (a) Vessels carrying loose grain in bulk shall have suitable means of securing hatchways and other weather deck openings. Hatch covers and their supports shall be in good condition and properly battened down using good and sufficient tarpaulins, cleats and wedges where necessary.

§ 144.10–90 *Equivalents.* (a) Where the regulations in this part require a particular fitting, appliance or apparatus or type thereof, shall be fitted or carried in a ship, or that any particular provisions shall be made, the District Commander of the United States Coast Guard or his authorized representative may allow any other fitting, appliances or apparatus, or type thereof, to be fitted or carried, or any other provision to be made, if it is satisfactorily shown that such other fitting, appliance or apparatus, or type thereof, or provision is at least as effective as that required by the regulations in this part.

SUBPART 144.20—DETAILED LOADING AND STOWAGE REQUIREMENTS

§ 144.20–1 *Bagged grain.* Bagged grain stowed in a hold, compartment or bin with loose grain in bulk shall be in sound bags, well filled and securely closed.

§ 144.20–10 *Holds or compartments partly filled with loose grain in bulk.* (a) In any hold or compartment which is partly filled with loose grain in bulk the grain shall be levelled and topped off with bagged grain or other suitable cargo extending to a height not less than 4 feet above the top of the loose grain in bulk and supported on suitable platforms in accordance with paragraph (b) of this section, laid over the whole surface of the loose grain in bulk. Also, the hold or compartment shall be divided by a properly constructed longitudinal bulkhead or shifting boards, in line with the keel, which shall extend from the bottom of the hold or deck as the case may be to a height of not less than 2 feet above the surface of the bulk grain to prevent shifting.

(b) The platform required by the regulations in this part shall consist of bearers spaced not more than 4 feet apart and 1 inch boards laid thereon spaced not more than 4 inches apart, or tarpaulins or strong separation cloths with adequate overlapping.

(c) The fitting of a longitudinal bulkhead or shifting boards in a lower hold shall not be required if the grain in bulk does not exceed ⅓ of the capacity of the hold, or in the case of a hold containing a shaft or other similar tunnel, ½ the capacity of that hold.

§ 144.20–20 *Holds or compartments entirely filled with loose grain in bulk.* (a) Every hold or compartment which is entirely filled with loose grain in bulk shall be divided by a longitudinal bulkhead or shifting boards, in line with the keel, which shall be properly constructed, secured and fitted grain tight with proper fillings between the beams. In holds such shifting boards shall extend downwards from the underside of the deck to a distance of at least ⅓ of the depth of the hold or 8 feet, whichever is the greater. In compartments in 'tween decks and superstructures they shall extend from deck to deck. In all cases the shifting boards shall extend to the top of the feeders of the hold or compartment in which they are situated.

(b) All bulk grain shall be well trimmed up between the beams and in the wings, and the spaces between them shall be completely filled.

(c) Every hold, compartment or bin which is entirely filled with loose grain in bulk shall be fed by suitably placed and properly constructed feeders, which shall contain not less than 2½ percent or more than 8 percent of the quantity of grain carried in the compartment that they feed. When loose grain in bulk is loaded in a deep tank, specially built feeders shall not be required provided that the deep tank is divided by a steel center longitudinal division and the bulk grain is well stowed, the tank and tank hatchways completely filled and the hatch covers secured.

(d) Feeders to a hold or compartment shall be so arranged as to secure a free flow of grain to all parts of that hold or compartment; where the distance, measured in a fore and aft line, from any part of a hold or compartment to the nearest feeder exceeds 25 feet, then grain in the end spaces beyond 25 feet from the nearest feeder shall be levelled off at a depth of at least 6 feet below the deck, and the end spaces filled with bagged grain built up on a proper platform.

§ 144.20–30 *Location of stowage for light grain in bulk.* (a) Light grain in bulk may be carried in the holds and 'tween decks of all ships and in the superstructures of single decked ships, subject to the provisions of the regulations in this part relating to shifting boards and feeders. In vessels where 'tween decks and/or shelter decks are not subdivided, bulkheads are to be constructed to divide such shelter or 'tween decks into compartments of a maximum length not exceeding 70 feet.

§ 144.20–40 *Location of stowage for heavy grain in bulk.* (a) Heavy grain in bulk shall not be carried above deck in a single deck ship, or in the 'tween deck of a two-decked ship, or in the uppermost 'tween deck of a ship having more than two decks except in feeders properly constructed as required by the regulations in this part or in bins properly constructed as required by the regulations in this part. Where heavy grain in bulk is carried in bins the following requirements shall be complied with:

(1) The compartment or compartments immediately below the bins shall be completely filled with bulk grain;

(2) The hold or compartment below the bin or bins shall be properly battened down clear of the feeder to such hold or compartment;

(3) The aggregate quantity of grain carried in bins and all feeders shall not exceed 23 percent by weight of the total grain cargo below the deck on which the bins are situated;

(4) The capacity of any bin shall not exceed 8,000 cubic feet;

(5) Where the distance from the feeder to the transverse bulkhead exceeds 20 feet, the space beyond shall be filled with bagged grain or other suitable cargo;

(6) Where a bin is not completely filled with grain, the provisions of

§ 144.20–10 as to levelling and topping off shall apply.

SUBPART 144.30—VESSELS SHIFTING PORTS

§ 144.30–1 *Shifting vessels with part cargoes of loose grain in bulk.* (a) The regulations in this subpart shall apply to vessels loaded with part cargoes of loose grain in bulk shifting between ports for the purpose of loading additional cargo and modify certain requirements under Subpart 144.20. Masters of all vessels shifting ports under these modified requirements shall check with the Weather Bureau to ascertain the forecast of the weather to be encountered on the voyage and shall not proceed under these conditions when unusually adverse weather conditions are indicated.

(b) Vessels subject to the regulations in this part, mooring between ports totally within the inland waters of the United States, may load any amount of loose grain in bulk without securing the grain provided shifting boards extend above the grain in each hold at least 2 feet. Vessels that have no longitudinal bulkheads or shifting boards in the lower holds shall comply with § 144.20–10 (c).

(c) Vessels shifting between United States ports along the east coast as far south as Cape Henry, between Gulf ports, between Puget Sound ports and West Coast Canadian ports, or between Puget Sound ports and Columbia River ports may load the following amounts without securing the grain provided the grain is covered with dunnage boards placed fore and aft and athwartship.

(1) Any hold with less than 50 percent of its bulk grain capacity provided shifting boards extend above the grain in each hold at least 2 feet.

(2) One hold with more than 50 percent of its bulk grain capacity and one other hold with less than 50 percent of its bulk grain capacity provided shifting boards extend above the grain in each hold at least 2 feet.

(3) Where no longitudinal bulkheads or shifting boards are required to be erected, only two slack holds not exceeding the capacities specified in § 144.20–10 (c).

Subchapter P—Manning of Vessels

The title for Subchapter P is changed from "General Provisions" to "Manning of Vessels"; the title for Part 157 is changed from "Enforcement" to "Manning Requirements", and Part 157 is amended to read as follows:

PART 157—MANNING REQUIREMENTS

SUBPART 157.01—AUTHORITY AND PURPOSE

Sec.
157.01–1 Purpose of regulations.
157.01–5 Assignment of functions.
157.01–10 Authority for regulations.

SUBPART 157.05—APPLICATION

157.05–1 General.

SUBPART 157.10—DEFINITIONS OF TERMS

157.10–1 General.
157.10–5 Able seaman.
157.10–10 Assistant engineer.
157.10–15 Chief engineer.
157.10–20 Deck crew.
157.10–25 Licensed officer.
157.10–30 Lifeboatman.
157.10–35 Master.
157.10–40 Mate.
157.10–45 Ordinary seaman.
157.10–50 Pilot.
157.10–55 Qualified member of the engine department.
157.10–60 Radio officer.
157.10–65 Sailors.
157.10–70 Seaman.
157.10–75 Staff officers.
157.10–80 Tankerman.

SUBPART 157.15—MANNING REQUIREMENTS

157.15–1 Complement required by certificate of inspection.
157.15–5 Changes in certificate of inspection.
157.15–10 Right of appeal.
157.15–15 Enforcement officers.

SUBPART 157.20—COMPUTATIONS

157.20–1 Vessels affected.
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AUTHORITY: §§ 157.01–1 to 157.35–5 issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Statutory provisions interpreted or applied are cited to text in parentheses.

SUBPART 157.01—AUTHORITY AND PURPOSE

§ 157.01–1 *Purpose of regulations.* (a) The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for the manning of vessels in accordance with the intent of Titles 52 and 53 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various international conventions for safety of life at sea and other treaties which affect the merchant marine. The regulations are necessary to carry out the provisions of law affecting United States vessels and have force of law.

§ 157.01–5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950, effective July 31, 1950, the functions formerly vested in the Commandant, United States Coast Guard, were transferred to the Secretary of the Treasury with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 157.01–10 *Authority for regulations*—(a) *General.* (1) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375, and 416), as well as in other provisions of Titles 52 and 53 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) *Manning of inspected vessels.* (1) The requirements regarding the manning of inspected vessels, including inspected motorboats carrying passengers for hire, are set forth in various statutes with many qualifications as to their applications. The regulations interpret or apply subject to various limitations contained in the laws, R. S. 4401, 4417a, 4421, 4426, 4427, 4438, 4438a, 4453, 4463, 4477, 4498, and 4551 (j), as amended, sec. 2, 37 Stat. 733, secs. 2 and 13, 38 Stat. 1164, 1169, 49 Stat. 1544, 1545, 1936, sec. 7, 53 Stat. 1147, secs. 7 and 17, 54 Stat. 165, 166, sec. 3, 54 Stat. 347, and sec. 5, 55 Stat. 244, 245, secs. 1 to 8, 62 Stat. 232–234, as amended (46 U. S. C. 364, 391a, 399, 404, 405, 224, 224a, 435, 222, 470, 481, 643 (j), 223, 673, 672, 367, 689, 247, 526f, 526p, 1333, 229a-229h; and 50 U. S. C. App. 1275).

(c) *Manning of uninspected vessels.* (1) The authority for regulations regarding manning of all vessels of 200 gross tons and over, however propelled, including yachts, navigating the high seas, which are subject to the provisions of the Officers' Competency Certificates Convention, 1936 (International Labor Organization Draft Convention Numbered 53), is in R. S. 4438a, as amended (46 U. S. C. 224a).

(2) The authority for regulations regarding the licensed operator for an uninspected motorboat while carrying passengers for hire is in secs. 7 and 17, 54 Stat. 165, 166, as amended (46 U. S. C. 526f, 526p).

SUBPART 157.05—APPLICATION

§ 157.05–1 *General.* (a) The regulations in this part shall be applicable to all vessels which are subject to the manning requirements contained in the navigation and vessel inspection laws of the United States. Since the manning requirements for a particular vessel can only be determined after a thorough consideration of the many factors in-

volved, such as size, type, proposed routes of operation, cargo carried, type of business in which employed, etc., the Officer in Charge, Marine Inspection, shall determine if such vessel is subject to any or all of the manning provisions of the navigation and vessel inspection laws and shall establish, when required by law or regulation in this chapter, the minimum manning requirements considered necessary for the safe navigation of the vessel.

(b) Some of the navigation and vessel inspection laws do not authorize the establishment of a minimum number of officers and members of the crew to be carried on board a vessel but state that the vessel shall not be operated or navigated unless certain manning requirements are met. In these cases, it is the responsibility of the owner, master, or person in charge or command of the vessel, to determine if the officers and crew carried meet the requirements of the applicable navigation and vessel inspection laws.

(c) At the beginning of the various subparts or sections, a more specific application is generally given for the particular portion of the text involved. This application may be according to size and type of vessel or waters navigated or services of vessel to which the text pertains.

SUBPART 157.10—DEFINITIONS OF TERMS

§ 157.10–1 *General.* (a) The terms defined in this subpart apply only to manning of vessels subject to the manning provisions in the navigation and vessel inspection laws of the United States.

§ 157.10–5 *Able seaman.* (a) The term "able seaman" means any person holding a certificate of efficiency issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the certificate.

(Sec. 13, 38 Stat. 1169, as amended; 46 U. S. C. 672)

§ 157.10–10 *Assistant engineer.* (a) The term "assistant engineer" means a person holding a valid license issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the license.

(R. S. 4438, 4438a, 4441, as amended; 46 U. S. C. 224, 224a, 229)

§ 157.10–15 *Chief engineer.* (a) The term "chief engineer" means any person responsible for the mechanical propulsion of a vessel and who is a holder of a valid license issued by the Coast Guard attesting to his competency, and who may serve in such capacity within the restrictions placed on the license.

(R. S. 4438, 4438a, 4441, as amended; 46 U. S. C. 224, 224a, 229)

§ 157.10–20 *Deck crew.* (a) The term "deck crew, exclusive of licensed officers and apprentices" as used in section 13 of the Seamen's Act of 1915, as amended (46 U. S. C. 672) is construed as including only the following members of the deck department below the grade of licensed officer and above the grade of apprentice; viz, quartermasters, able seamen, and ordinary seamen.

(Sec. 13, 38 Stat. 1169, as amended; 46 U. S. C. 672)

§ 157.10–25 *Licensed officer.* (a) The term "licensed officer" means any person holding a license issued by the Coast Guard which attests to the holder's competency to serve in the capacity described in the license on board vessels, such as master, mate, pilot, chief engineer, assistant engineer, or radio officer.

§ 157.10–30 *Lifeboatman.* (a) The term "lifeboatman" means any person holding a certificate of efficiency issued by the Coast Guard attesting to his competency to serve as a lifeboatman.

(R. S. 4488, as amended; 46 U. S. C. 481)

§ 157.10–35 *Master.* (a) A "master" means any person who is holder of a valid license issued by the Coast Guard attesting to his competency, and who may serve in such capacity within the restrictions placed on the license.

(R. S. 4438, 4438a, 4439, as amended; 46 U. S. C. 224, 224a, 226)

§ 157.10–40 *Mate.* (a) The term "mate" means a person holding a valid license issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the license.

(R. S. 4438, 4438a, 4440, as amended; 46 U. S. C. 224, 224a, 228)

§ 157.10–45 *Ordinary seaman.* (a) The term "ordinary seaman" means any person holding a certificate of service issued by the Coast Guard and who may serve in such capacity on board vessels.

(Sec. 13, 38 Stat. 1169, as amended; 46 U. S. C. 672)

§ 157.10–50 *Pilot.* (a) The term "pilot" means a person holding a valid license issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the license.

(R. S. 4438, 4442, as amended; 46 U. S. C. 224, 214)

§ 157.10–55 *Qualified member of the engine department.* (a) The term "qualified member of the engine department" means any person holding a certificate of service issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the certificate.

(Sec. 13, 38 Stat. 1169, as amended; 46 U. S. C. 672)

§ 157.10–60 *Radio officer.* (a) The term "radio officer" means a person holding a valid license issued by the Coast Guard and who may serve in such capacity within the restrictions placed on the license.

(Sec. 3, 62 Stat. 233, as amended; 46 U. S. C. 229c)

§ 157.10–65 *Sailors.* (a) The term "sailors" means those members of the deck department below the grade of licensed officer whose ordinary duties are incident to the mechanics of conducting the ship on her voyage, such as able seaman, ordinary seaman, quartermaster, lookout man, etc.

(Sec. 2, 38 Stat. 1164, as amended; 46 U. S. C. 673)

§ 157.10–70 *Seaman.* (a) The term "seaman" is defined in R. S. 4612, as amended (46 U. S. C. 713), as follows:

Every person (apprentice excepted) who shall be employed or engaged to serve in any capacity on board the same (vessel) shall be deemed and taken to be a "seaman".

§ 157.10–75 *Staff officers.* (a) The term "staff officers" means persons in the Staff Department who hold certificates of registry as a (1) Chief Purser; (2) Purser; (3) Senior Assistant Purser; (4) Junior Assistant Purser, or (5) Surgeon, which are issued by the Coast Guard.

(Sec. 1, 53 Stat. 1145, as amended; 46 U. S. C. 242)

§ 157.10–80 *Tankerman.* (a) The term "tankerman" means any person holding a certificate issued by the Coast Guard attesting to his competency in the handling of inflammable or combustible liquid cargo in bulk or any person holding a currently valid license as master, mate, pilot, or engineer.

(R. S. 4417a, as amended; 46 U. S. C. 391a)

SUBPART 157.15—MANNING REQUIREMENTS

§ 157.15–1 *Complement required by certificate of inspection.* (a) The Officer in Charge, Marine Inspection, who inspects a vessel shall make entries on the certificate of inspection showing the complement of licensed officers and crew, including certificated lifeboatmen, separately stated, as may be necessary for the safe navigation of the vessel.

(R. S. 4438, 4463, as amended; 46 U. S. C. 224, 222)

§ 157.15–5 *Changes in certificate of inspection.* (a) All applications for changes in certificates of inspection relative to crew requirements shall be made to the Officer in Charge, Marine Inspection, at or nearest the port where the vessel actually is at the time the request is made.

(b) Where changes in an outstanding certificate of inspection are necessary the Officer in Charge, Marine Inspection, will issue an amendment to the certificate of inspection.

(R. S. 4421, as amended; U. S. C. 399)

§ 157.15–10 *Right of appeal.* (a) Whenever any person directly interested in or affected by any decision or action of any Officer in Charge, Marine Inspection, shall feel aggrieved by such decision or action with respect to manning requirements, he may appeal therefrom to the Coast Guard District Commander having jurisdiction, and a like appeal shall be allowed from any decision or action of the Coast Guard District Commander to the Commandant, whose action shall be final; *Provided, however,* That such appeals shall be made in writing within 30 days after the decision or action appealed from shall have been rendered or taken: *And provided further,* That pending the determination of the

appeal the crew, originally specified must be carried.

(R. S. 4463, as amended; 46 U. S. C. 222)

§ 157.15–15 *Enforcement officers.* (a) In addition to collectors of customs, who are specifically designated by law as enforcement officers, all field officers and inspectors of the Coast Guard are designated as enforcement officers for the purpose of seeing that the provisions of section 2 of the Seamen's Act of 1915, as amended (38 Stat. 1164, as amended; 46 U. S. C. 673), are complied with.

SUBPART 157.20—COMPUTATIONS

§ 157.20–1 *Vessels affected.* (a) All of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U. S. C. 673), apply to all merchant vessels of the United States of more than 100 tons gross, excepting those navigating rivers, harbors, lakes (other than Great Lakes), bays, sounds, bayous, and canals, exclusively, and also insofar, as hours of labor on shipboard are concerned, to all tugs documented under the laws of the United States (except boats or vessels used exclusively for fishing purposes) navigating the Great Lakes, harbors of the Great Lakes and connecting and tributary waters between Gary, Indiana; Duluth, Minnesota; Niagara Falls, New York; and Ogdensburg, New York. The aforesaid section 2 does not apply to fishing or whaling vessels, yachts or to vessels engaged in salvage operations.

(Sec. 2, 38 Stat. 1164, sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 673, 689)

§ 157.20–5 *Division into three watches.* (a) On vessels to which all of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U. S. C. 673), apply, the licensed officers, sailors, coal passers, firemen, oilers, and water tenders shall, while at sea, be divided into at least 3 watches, the number in each watch to be as nearly equal as the division of the total number in each class will permit. The watches shall be kept on duty successively. The requirement for division into watches applies only to those classes of the crew specifically named in the aforesaid section 2: *Provided*, That in the case of radiotelegraph operators this requirement shall be applicable only when 3 or more radio officers are employed.

(b) Officers in Charge, Marine Inspection, will note that the 3-watch system extends to all licensed officers and to the sailors, coal passers, firemen, oilers, and water tenders of all vessels to which all of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U. S. C. 673), apply and will be governed accordingly in fixing the complement of licensed officers and crew, as authorized by R. S. 4463, as amended (46 U. S. C. 222): *Provided*, That in the case of radio telegraph operators this requirement shall be applicable only when 3 or more radio officers are employed. The aforesaid section 2 does not, however, apply to the licensed officers and crew of tugs and barges when engaged in voyages of less than 600 miles except with regard to coal passers, firemen, oilers, and water tenders. A voyage of less than 600 miles is construed as meaning the entire distance traversed in proceeding from the initial port of departure to the final port of destination, stops at intermediate ports while enroute not being considered as breaking the continuity of the voyage.

(R. S. 4421, 4463, as amended, sec. 2, 38 Stat. 1164, sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 399, 222, 673, 689)

§ 157.20–10 *Eight-hour day.* (a) No licensed officer or seamen in the deck or engine department of vessels to which all of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U. S. C. 673), apply shall be required to be on duty more than 8 hours in any one day except under the extraordinary conditions mentioned in the aforesaid section 2, nor shall any licensed officer or seamen in the deck or engine department of any tug documented under the laws of the United States (except boats or vessels used exclusively for fishing purposes) navigating the Great Lakes,[1] harbors of the Great Lakes, and their connecting and tributary waters between Gary, Indiana; Duluth, Minnesota; Niagara Falls, New York; and Ogdensburg, New York, be required or permitted to be on duty more than 8 hours in any one day, except in case of extraordinary emergency affecting the safety of the vessel and/or life or property.

(b) When the vessel is in a safe harbor, no seamen shall be required to do any unnecessary work on Sundays, New Year's Day, the Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day, but this shall not prevent the dispatch of a vessel on regular schedule or when ready to proceed on her voyage.

(Sec. 2, 38 Stat. 1164, sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 673, 689)

§ 157.20–15 *Able seamen*—(a) *What vessels affected.* (1) The provisions of section 13 of the Seamen's Act of 1915, as amended (46 U. S. C. 672), relating to able seamen apply to all merchant vessels of the United States of 100 gross tons and upward except those navigating rivers exclusively and the smaller inland lakes; except as provided in R. S. 4516, as amended (46 U. S. C. 569); and except unrigged vessels (other than seagoing barges), and sail vessels of less than 500 net tons while not carrying passengers for hire and while not operating outside the line dividing inland waters from the high seas, established in accordance with section 2 of the act of February 19, 1895, as amended (33 U. S. C. 151).

(b) *Computation of number.* (1) On vessels to which the provisions of section 13 of the Seamen's Act of 1915, as amended (46 U. S. C. 672), apply, at least 65 per centum of the deck crew, exclusive of licensed officers and apprentices, shall be of a rating not less than able seamen. In the event that the number of persons in the deck crew, as defined in § 157.10–20 (a), is in excess of the number of persons required therein by the certificate of inspection, at least 65 per centum of the whole deck crew on the vessel, exclusive of licensed officers and apprentices, shall be of a rating of not less than able seamen.

(Sec. 13, 38 Stat. 1169, sec. 2, 38 Stat. 1164, sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 672, 673, 689)

§ 157.20–20 *Lifeboatmen.* (a) There shall be for each lifeboat or life raft a number of certificated lifeboatmen in accordance with the various regulations in Subchapter D (Tank Vessels), Subchapter H (Passenger Vessels), and Subchapter I (Cargo and Miscellaneous Vessels) of this chapter which specify the number required under various circumstances and conditions.

(R. S. 4417a, 4488, as amended, 49 Stat. 1944, 1945, sec. 5, 55 Stat. 244, 245; 46 U. S. C. 391a, 481, 367, 50 U. S. C. App. 1275)

§ 157.20–25 *Mates.* (a) The minimum number of mates on every ocean and coastwise merchant vessel of the United States propelled by machinery and every ocean-going vessel carrying passengers shall be in accordance with sec. 2 of the Act of March 3, 1913, as amended (37 Stat. 733, 46 U. S. C. 223).

(37 Stat. 733; 46 U. S. C. 223)

§ 157.20–30 *Master.* (a) Section 2 of the Act of March 3, 1913, as amended (37 Stat. 733, 46 U. S. C. 223) requires a master for every ocean and coastwise merchant vessel of the United States propelled by machinery and every ocean-going vessel subject to inspection and carrying passengers.

(b) The provisions of R. S. 4438, as amended (46 U. S. C. 224), requires a master for every sail vessel of over 700 gross tons.

(c) There shall be a duly licensed master on board every steam vessel of more than 150 gross tons when the vessel is underway on the Great Lakes, or bays, sounds, or lakes other than the Great Lakes, or rivers.

(d) There shall be a licensed master on board every seagoing motor vessel of 300 gross tons or over, subject to section 1 of the Act of June 20, 1936 (49 Stat. 1544, 1545; 46 U. S. C. 367), when the vessel is under way.

(e) For a steam vessel not exceeding 150 gross tons navigating the Great Lakes, or bays, sounds or lakes other than the Great Lakes, or rivers, a first class pilot or a second class pilot who has reached the age of 21 years may act as master.

(R. S. 4463, as amended; 46 U. S. C. 222)

§ 157.20–35 *Engineers.* (a) On any vessel subject to inspection, the Officer in Charge, Marine Inspection, shall determine the minimum number of engineers necessary for the safe navigation of a vessel.

(R. S. 4438, 4463, as amended; 46 U. S. C. 224, 222)

(b) The provisions of R. S. 4426, as amended (46 U. S. C. 404), requires a licensed engineer for a vessel above 15 gross tons propelled by gas, fluid, naphtha, or electric motors, carrying freight or passengers for hire, except for a motorboat subject to the act of April 25, 1940, as amended (54 Stat. 164–167; 46 U. S. C. 526–526t).

[1] The reissuance of this regulation shall not affect the waiver order in § 154.19 of this chapter.

(c) The provisions of R. S. 4426, as amended (46 U. S. C. 404), requires a licensed engineer on every ferryboat, canal boat, yacht, or other small craft of like character propelled by steam, except for a motorboat subject to the act of April 25, 1940, as amended (54 Stat. 164–167; 46 U. S. C. 526–526t).

§ 157.20–40 *Pilot.* (a) The provisions of R. S. 4401, as amended (46 U. S. C. 364), require that every coastwise seagoing steam vessel subject to the navigation laws of the United States, not sailing under register, shall, when underway, except on the high seas, be under the control and direction of pilots licensed by the Coast Guard.

(b) The provisions of R. S. 4426, as amended (46 U. S. C. 404), requires a licensed pilot on every ferryboat, canal boat, yacht, or other small craft of like character propelled by steam, except for a motorboat subject to the act of April 20, 1940, as amended (54 Stat. 164–167; 46 U. S. C. 526–526t).

(c) The provisions of R. S. 4426, as amended (46 U. S. C. 404), requires a licensed pilot for a vessel of above 15 gross tons propelled by gas, fluid, naphtha, or electric motors, carrying passengers for hire, except for a motorboat subject to the act of April 25, 1940, as amended (54 Stat. 164–167; 46 U. S. C. 526–526t).

(d) The provisions of R. S. 4426, as amended (46 U. S. C. 404) requires a pilot on every vessel of above 15 gross tons propelled by gas, fluid, naptha, or electric motors carrying freight for hire, except for a motorboat subject to the act of April 25, 1940, as amended (54 Stat. 164–167; 46 U. S. C. 526–526t).

(e) (1) For every inspected steam vessel of above 150 gross tons the navigation shall be under the control of a first class pilot when the vessel is underway on the Great Lakes, or bays, sounds, and lakes other than the Great Lakes, or rivers.

(2) For every inspected steam vessel not exceeding 150 gross tons the navigation shall be under the control of a first class or a second class pilot when the vessel is underway on the Great Lakes, or bays, sounds, and lakes other than the Great Lakes, or rivers; and a first class pilot or a second class pilot, who has reached the age of 21 years, may act as master or pilot in charge of navigation.

(3) A second class pilot is authorized to act as pilot in charge of a watch on any steam vessel within the qualifications specified in his license.

(R. S. 4438, 4463, as amended; 46 U. S. C. 224, 222)

§ 157.20–45 *Lookouts.* (a) The requirements regarding lookouts for passenger vessels are in § 78.30–1 of Subchapter H (Passenger Vessels) of this chapter.

(b) The requirements regarding lookouts for cargo and miscellaneous vessels are in § 97.27–1 of Subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

§ 157.20–50 *Cabin watchmen and fire patrolmen.* (a) The requirements for cabin watchmen and fire patrolmen for passenger vessels are in § § 78.30–10 to 78.30–20, inclusive, of Subchapter H (Passenger Vessels) of this chapter.

§ 157.20–55 *Radio officers and radiotelegraph operators and watches.* (a) Radio officers and radiotelegraph operators and watches are required on certain merchant vessels of the United States. The details of the application of this requirement, as well as details regarding the licensing of such personnel, shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission and the statutes and regulations under the jurisdiction of the United States Coast Guard, regarding radio officers and radiotelegraph operators. (See Subchapter B (Merchant Marine Officers and Seamen) of this chapter.)

(R. S. 4463, as amended, sec. 1, 62 Stat. 232; 46 U. S. C. 222, 229a)

§ 157.20–60 *Staff officers.* (a) When a staff department is carried on a passenger vessel subject to the act of August 1, 1939, as amended (53 Stat. 1145–1147, as amended; 46 U. S. C. 243–247), the qualifications of staff officers engaged shall be in accordance with that act.

SUBPART 157.25—LANGUAGE REQUIREMENTS

§ 157.25–1 *Vessels affected.* (a) Section 13 of the act of March 4, 1915, as amended (38 Stat. 1169, as amended; 46 U. S. C. 672), in part, provides as follows:

> No vessel of 100 gross tons and upward, except those navigating rivers exclusively and the smaller inland lakes and except as provided in section 1 of this act, shall be permitted to depart from any port of the United States unless she has on board a crew not less than 75 per centum of which, in each department thereof, are able to understand any order given by the officers of such vessel, * * *.
>
> The collector of customs, may upon his own motion, and shall, upon the sworn information of any reputable citizen of the United States setting forth that this section is not being complied with, cause a muster of the crew of any vessel to be made to determine the fact; and no clearance shall be given to any vessel failing to comply with the provisions of this section.[12]

§ 157.25–5 *Orders by officers.* (a) The Commandant construes the words "able to understand any order given by the officers of such vessel" to mean any orders that may be given to members of the crew in each department when directing the performance of their duties.

(b) The Commandant also construes this section 13 of the act of March 4, 1915, (38 Stat. 1169, as amended; 46 U. S. C. 672) as meaning only such orders as may be given to members of the crew in each department of the vessel in the course of the performance of their several duties. Among these duties, however, should be included lifeboat or emergency work. The Commandant would not consider it a proper construction of the section to require, for example, that a waiter should understand orders normal to the engine-room force or that a stoker should understand orders which related solely to the work of a deck hand or seaman. In the cases, however, of a waiter, a stoker, a seaman, or other employee on the vessel who was assigned to do emergency or lifeboat work it would be a proper construction of the section to require him to understand orders for such emergency or lifeboat service.

(Sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 689)

§ 157.25–10 *Muster of crew for language test.* (a) When the collector of customs musters the crew on any vessel, either upon his own motion or upon the sworn information of any reputable citizen, for the purpose of determining that 75 percent of the crew in each department is able to understand any order given by the officer of such vessel, the Commandant is of the opinion that a demonstration of such understanding shall be made in the presence of the collector of customs or his authorized representative.

(b) To determine the fact of understanding, the Commandant is of the opinion that the law requires that orders be given to the individual members of the crew by the officers of the ship, and in the language ordinarily and customarily used by such officers in navigating and operating the ship. The orders should be given directly by the officers to each member of the crew, and not through an interpreter or interpreters; signs, gestures or signals should not be used in making the test. The collector of customs or his representative should suggest to the officers of the vessel the orders to be given, which should touch upon matters ordinarily arising in the daily routine work of the crew in each department, as well as orders involving fire drills, boat drills, the handling of boats, and orders involving any emergencies that may be expected to arise in handling, operating, or navigating the ship.

(c) The muster of the crew for which the law provides shall take place at such reasonable times and occasions as will determine the facts sufficiently in advance of the time fixed for the sailing of the vessel to permit the engaging of such new members of the crew as may be necessary in time for the vessel to sail without delay. As the law requires the application for muster to be made at least 6 hours before the vessel departs or is scheduled to depart, thus indicating an intent not unduly to delay the sailing of vessels, the muster must be conducted with such promptness and expedition as to constitute full compliance with this manifest purpose of the law. Whenever the language test applied at the muster results in the rejection of any member of the crew and the substitution of another seaman in his place at such time as to render it impracticable for a second muster to be requested in the manner specified in this section, then and in that case it shall be the duty of the customs

[12] Amended by section 1 (d), 49 Stat. 1931, 46 U. S. C. 672 (d) reading as follows: The collector of customs may, upon his own motion, and shall, upon the sworn information of any reputable citizen of the United States setting forth that this section is not being complied with, cause a muster of the crew of any vessel to be made to determine the fact, at which muster said reputable citizen must be present; and no clearance shall be given to any vessel failing to comply with the provisions of this section.

collector to see that any seaman signed on the articles of the ship to take the place of the rejected man is capable of passing such test. The Commandant understands the law to require the safeguarding of the vessel through the language test by such means at such times and in such a manner as shall be helpful and not hurtful to our maritime commerce and that it is in no sense intended to be used to create embarrassment or to cause unnecessary expense or delay.

(Sec. 13, 38 Stat. 1169, sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 672, 689)

SUBPART 157.30—SPECIAL PROVISIONS

§ 157.30–1 *Manning of seagoing barges.* (a) The determination as to whether a seagoing barge shall be manned or not shall be made by the Officer in Charge, Marine Inspection. Permission may be granted for such barges to operate unmanned when in the opinion of the Officer in Charge, Marine Inspection, manning is not necessary for the safe operation of the vessel and where it appears that the requirements of the rules as to lights, etc., will be met. In any case the certificate of inspection will specify whether or not the barge is to be manned, the number and grade of the crew, when carried, and the conditions of operation when no crew is required. These conditions may include limitations as to loading, route, cargo, season of operation, etc.

(R. S. 4463, as amended, sec. 10, 35 Stat. 428, as amended; 46 U. S. C. 222, 395)

§ 157.30–5 *Tank vessels.* (a) The requirements for manning tank vessels is in Parts 31 and 35 of Subchapter D (Tank Vessels) of this chapter.

(R. S. 4417a, as amended; 46 U. S. C. 391a)

§ 157.30–10 *Officers for uninspected vessels.* (a) Every vessel, however propelled, 200 gross tons or over navigating the high seas and subject to the provisions of R. S. 4438a, as amended (46 U. S. C. 224a), shall have officers licensed by the Coast Guard. No person shall be engaged to perform or shall perform on board any such vessel, the duties of master, chief engineer, or watch officer deck or engineer unless he holds a valid license issued by the Coast Guard attesting to his qualifications to perform such duties.

(R. S. 4438a, as amended; 46 U. S. C. 224a)

§ 157.30–15 *Deck officers for steam or motor vessels operating under special conditions.* (a) The master, mates, and pilots of a steam vessel, or a sail vessel, or a vessel propelled by internal-combustion engines of 200 gross tons and over navigating exclusively in and around the Hawaiian Islands may be holders of special valid licenses issued by the Coast Guard for such service.

(b) The master, mates, and pilots of a steam or a sail vessel or a seagoing motor vessel of 200 gross tons or over navigating exclusively between ports of the Island of Puerto Rico may be holders of special valid licenses issued by the Coast Guard for such service.

(c) The master, mate, and pilot of a steam pilot vessel, or seagoing motor pilot vessel of 200 gross tons or over, or of a steam vessel navigating the waters of the whaling grounds in the Alaskan seas, or of a steam vessel engaged exclusively in the business of whale fishing, or of a steam vessel engaged in the Atlantic, Pacific, or Gulf Coast fisheries, may be holders of special valid licenses issued by the Coast Guard for such service.

(d) For a vessel navigating exclusively in Alaska and subject to the provisions of the Act of March 4, 1907, as amended (34 Stat. 1411, 46 U. S. C. 237), the master and pilots may be Indians holding special valid licenses issued by the Coast Guard.

(R. S. 4438, 4438a, as amended, 34 Stat. 1411, 49 Stat. 1544, as amended; 46 U. S. C. 224, 224a, 237, 367)

§ 157.30–20 *Engineers for steam or motor vessels operating under special conditions.* (a) For seagoing vessels propelled by internal combustion engines navigating exclusively between ports in the Hawaiian Islands, or navigating exclusively between ports of the Island of Puerto Rico and/or the Virgin Islands, the engineers may be holders of special valid licenses issued by the Coast Guard for such service.

(b) For a vessel navigating exclusively in Alaska and subject to the provisions of the act of March 4, 1907, as amended (34 Stat. 1411, 46 U. S. C. 237), the engineers may be Indians holding special valid licenses issued by the Coast Guard.

(R. S. 4438, 4438a, as amended, 34 Stat. 1411, 49 Stat. 1544, 1545, as amended; 46 U. S. C. 224, 224a, 237, 367)

§ 157.30–25 *Vessels carrying persons in addition to crew.* (a) A steam vessel engaged in towing, or a steam vessel engaged in fishing or oyster planting or dredging, on the Great Lakes, and all inland waters (including rivers), may be authorized by the Coast Guard District Commander to carry on board such number of persons in addition to its crew as shall be deemed necessary to carry on the legitimate business of such vessel. The number of extra persons so carried shall not be in excess of the proportion of one such person to each net ton of measurement of the vessel and shall not be carried for hire.

(Sec. 1, 24 Stat. 129, as amended; 46 U. S. C. 458)

§ 157.30–30 *Licensed operator for motorboats.* (a) Every vessel subject to R. S. 4426, as amended (46 U. S. C. 404), or the Motorboat Act of April 25, 1940, as amended (54 Stat. 165, 166; 46 U. S. C. 526f, 526p), 15 gross tons or less, while carrying passengers for hire, shall be operated or navigated by a person duly licensed for such service by the Coast Guard.

(R. S. 4426, as amended, 54 Stat. 165, 166, as amended; 46 U. S. C. 404, 165, 166)

SUBPART 157.35—SPECIAL DUTIES OF PILOTS AND INLAND MATES

§ 157.35–1 *Pilots governed by rules.* (a) Pilots of steam vessels, while in the discharge of their duties, shall be governed by the rules of the Commandant made for their guidance, and not by any instructions, emanating from any inspector or other person.

§ 157.35–5 *Duties of mates of inland steam vessels.* (a) It shall be the duty of the mate of every inland steamer carrying passengers to assign to deck or steerage passengers the space they may occupy on board during the voyage, and to supervise the stowage of freight or cargo, and see that the space set apart for passengers is not encroached upon. He shall also carefully examine all marks on packages of freight delivered on board for shipment, with a view to detect and prevent any combustible or other dangerous articles prohibited by law being delivered on board.

(b) One copy of this section shall be furnished every steam vessel to which this section applies, to be framed under glass and posted on the main deck.

Subchapter Q—Specifications

PART 162—MATERIALS

Part 162 is amended by adding the following new subparts reading as follows:

SUBPART 162.001—SAFETY VALVES (POWER BOILERS)

Sec.

162.001–1 Applicable specifications.
162.001–2 Scope.
162.001–3 Definitions.
162.001–4 Materials.
162.001–5 Construction and workmanship.
162.001–6 Blow-down adjustment and popping tolerance.
162.001–7 Marking.
162.001–8 Flow rating tests.
162.001–9 Procedure for approval.

SUBPART 162.012—SAFETY VALVES (STEAM HEATING BOILERS)

162.012–1 Applicable specifications.
162.012–2 Scope.
162.012–3 Materials.
162.012–4 Construction and workmanship.
162.012–5 Marking.
162.012–6 Flow rating tests.
162.012–7 Procedure for approval.

SUBPART 162.013—RELIEF VALVES (HOT WATER HEATING BOILERS)

162.013–1 Applicable specifications.
162.013–2 Scope.
162.013–3 Materials.
162.013–4 Construction and workmanship.
162.013–5 Marking.
162.013–6 Flow rating tests.
162.013–7 Procedure for approval.

SUBPART 162.018—SAFETY RELIEF VALVES, LIQUEFIED COMPRESSED GAS

162.018–1 Applicable specifications.
162.018–2 Scope.
162.018–3 Materials.
162.018–4 Construction and workmanship.
162.018–5 Blow-down adjustment and popping tolerance.
162.018–6 Marking.
162.018–7 Flow rating tests.
162.018–8 Procedure for approval.

AUTHORITY: §§ 162.001–1 to 162.001–9, 162.012–1 to 162.012–7, 162.013–1 to 162.013–7, 162.018–1 to 162.018–8, issued under R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416. Interpret or apply R. S. 4417a, 4418, 4426–4431, 4433, 4434, 4453, as amended, 49 Stat. 1544, 54 Stat. 346, 1026, sec. 5, 55 Stat. 244, 245, as amended; 46 U. S. C. 391a, 392, 404–409, 411, 412, 435, 367, 1333, 463a, 50 U. S. C. App. 1275.

SUBPART 162.001—SAFETY VALVES (POWER BOILERS)

§ 162.001–1 *Applicable specifications.* (a) There are no other specifications applicable to this subpart, except as noted in this subpart.

§ 162.001–2 *Scope.* (a) This specification covers requirements for the design, construction and testing of safety valves intended for use on power boilers, unfired steam generators and reduced-pressure steam lines designed for pressures in excess of 30 p. s. i. and installed on merchant vessels subject to inspection by the Coast Guard.

§ 162.001–3 *Definitions*—(a) *Safety valve.* Safety valve is a safety device designed to open automatically to relieve excess pressure in the pressure vessel to which it is attached and to reclose automatically after relieving excess pressure.

(b) *Spring-loaded safety valve.* Spring-loaded safety valve is a safety valve fitted with a spring which normally holds the valve disk in a closed position against its seat and allows it to open or close at predetermined pressures. Spring-loaded safety valves are characterized by pop action.

(c) *Pressure-loaded, pilot-actuated safety valve.* Pressure-loaded, pilot-actuated safety valve is one which is held in the closed position by steam pressure and controlled in operation by a pilot actuator valve.

(d) *Spring-loaded, pilot-actuated safety valve.* Spring-loaded, pilot-actuated safety valve is one in which a spring is used in the conventional way to hold the disk against the seat, but which has a piston attached to the spindle directly or through a system of levers or cams and enclosed within a cylinder, which when subjected to a limiting or set pressure, unbalances the spring load thereby opening the valve. When the pilot closes, the pilot actuated valve also closes.

(e) *Spring-loaded pilot valve.* Spring-loaded pilot valve is a conventional safety valve designed to control the opening and closing of another spring-loaded safety valve through a pressure transmitting line led from the body of the pilot valve.

(f) *Power boiler.* A power boiler is a main boiler or auxiliary boiler designed for pressures in excess of 30 p. s. i. and used for all purposes for which steam may be required.

§ 162.001–4 *Materials.* (a) The materials used in the manufacture of safety valves shall conform to the applicable requirements of Subchapter F (Marine Engineering) of this chapter except as otherwise specified in this subpart.

(b) Bodies of safety valves may be made of carbon or alloy forged or cast steel, or cast bronze or of such other equivalent material as may be approved by the Commandant.

(c) Disks, seats, guides, adjusting rings, spindles, etc., shall be made of materials possessing corrosion and heat resistant qualities suitable for the service conditions to which they are subjected.

(d) Springs used in safety valves shall be of the best quality spring steel consistent with the design of the valve and the service requirement. Heat-resistant alloy-steel springs shall be used on valves intended for superheated steam service above 650 degrees F.

(e) Bonnet or yoke material of spring-loaded safety valves when subject to temperatures exceeding 900 degrees F. shall be made of material having low thermal expansion properties, or a cooling spool shall be provided to reduce the temperature between the valve body and the bonnet assembly.

(f) Cast iron is prohibited in the construction of any part of the safety valve except caps or lifting levers. When used for these parts the elongation shall be at least 5 percent in a two inch gauge length.

(g) Non-metallic material, except for gaskets and packing, is prohibited in the construction of safety valves as pressure parts.

§ 162.001–5 *Construction and workmanship.* (a) Safety valves shall be of the direct spring-loaded pop type, with seat inclined at any angle between 45 degrees and 90 degrees, inclusive, to the center of the spindle, or of such other type as may be approved by the Commandant. Lever or weighted safety valves are prohibited.

(b) Pressure parts of the safety valve and internals shall be designed for a pressure of not less than the set pressure of the valve. The inlet and outlet flanges shall conform to the requirements of Part 55 of Subchapter F (Marine Engineering) of this chapter.

(c) The nominal size of a safety valve shall be the inside diameter of the inlet opening to the individual valve disk. The nominal size of safety valves shall be not less than 1½ inches nor more than 4 inches. Safety valves shall have flanged inlets or welding ends, and have either flanged or screwed side outlets, except outlets exceeding 4 inches in diameter shall be flanged.

(d) Safety valves shall be so constructed that the failure of any part cannot obstruct the free and full discharge of steam from the valve.

(e) (1) Springs used in safety valves shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(2) The spring shall be so constructed that the disk can lift from its seat to a height not less than 25 percent greater than the rated capacity lift of the valve before the coils are closed or before there is other interference. Whenever lift stops are used by the manufacturer for the purpose of preventing overlift they shall permit the full-rated capacity lift plus a minimum tolerance of 1/64 inch.

(3) Springs of boiler safety valves shall be of the exposed spring type when the temperature of the steam exceeds 450 degrees F. Exposed springs shall be enclosed in a ventilated metal housing preferably of the louver type or perforated with holes not exceeding 3/16 inch in diameter and sealed to prevent tampering.

(4) The spring in a safety valve may be re-set for the maximum or minimum pressures given on the data plate attached to the valve. This variation in set pressures shall not exceed plus or minus 10 percent.

(5) If the operating conditions of a valve are changed so as to require a new spring under subparagraph (e) (4) of this section for a different pressure, the valve shall be adjusted by the manufacturer or his authorized representative who shall furnish and install a new name plate as required under § 162.001–7.

(f) Each safety valve shall have a substantial lifting device by which the valve disk positively may be lifted from its seat at a pressure of not more than 75 percent of the set pressure of the valve.

(g) Safety valves of 1½ inch size shall be tapped for not less than ¼ inch pipe size drain located below the level of the seat. Safety valves, 2 inch size and larger shall be tapped for not less than ⅜ inch pipe size drain located below the seat and at the lowest level where liquid can collect.

(h) (1) All safety valves for use on boilers and superheaters shall be supplied with gags or clamps for holding the disk on its seat when blow-down adjustments are made and when the hydrostatic tests are being applied. Gagging a safety valve by means of a set screw through the top of the cap or by screwing down the compression or adjusting screw to hold the valve on its seat is prohibited.

(2) Safety valves for use on unfired steam generators are not required to be fitted with gags or clamps.

(i) The design of the bonnet, huddling device, valve disk and discharge outlet shall be such as to prevent any appreciable back pressure in the valve body from interfering with the normal operation of the valve.

(j) Safety valves shall be constructed so that shocks detrimental to the valve or boiler are not produced when lifting or closing.

(k) The safety valve seat shall be secured to the body of the valve in such a way that there is no possibility of the seat lifting. Where possible, seats and seat bushing shall be made up all in one piece.

§ 162.001–6 *Blow-down adjustment and popping tolerance.* (a) Safety valves shall be designed to pop open instantly and reach full lift and capacity at the maximum accumulation permitted by § 162.001–8. Valve closure after popping shall be clean and sharp. Safety valves shall operate satisfactorily without chattering.

(b) The blow-down on all boiler safety valves shall be set and adjusted as follows:

(1) For pressures of 100 pounds per square inch and below, to close after blowing down between limits of from 2 pounds per square inch to 4 percent of the set pressure.

(2) For pressures exceeding 100 pounds per square inch, to close after blowing down between limits of from 2 percent to 4 percent of the set pressure.

(3) Safety valves on forced-circulation boilers of the once-through type may be set and adjusted to close after blowing down not more than 10 percent of the set pressure. The valve for this special use shall be so adjusted and marked by the manufacturer.

(c) The popping point tolerance, plus or minus, of all safety valves shall not exceed the following:

(1) For pressures not exceeding 70 pounds per square inch, 2 pounds per square inch.

(2) For pressures of from 71 to 300 pounds per square inch, 3 percent.

(3) For pressures exceeding 300 pounds per square inch, 10 pounds per square inch.

(d) After the valve is set and adjusted, the tolerance, in popping and reseating pressures shall not vary more than plus or minus 1 percent for saturated steam and 1½ percent for superheated steam service.

(e) The design of the huddling device shall be such that its adjustment will remain symmetrical with the axis of the valve and shall include a suitable stop for fixing such device after adjustment is made.

(f) The blow-down adjustment shall be made and sealed by the manufacturer. To insure the guaranteed capacity and satisfactory operation, the blow-down as stamped on the valve shall not be reduced.

§ 162.001–7 *Marking.* (a) Each safety valve shall be plainly marked by the manufacturer in such a way that the markings will not be obliterated in service. The markings may be stamped on the body, or stamped or cast on a plate securely fastened to the body, and shall contain the following information:

(1) The name or identifying trademark of the manufacturer.

(2) In the upper right-hand corner shall be placed the official Coast Guard stamp as shown in Figure 162.001–7 (a) (2).

FIGURE 162.001–7 (a) (2)

(3) Manufacturer's design or type number.

(4) Size _____ in. Seat Diameter _____ in. (nominal diameter of valve inlet).

(5) Set pressure _____ p. s. i. Pressure rating _____ p. s. i. (the pressure at which the valve is set to blow) (body primary service pressure rating).

(6) B. D. _____ p. s. i. (blow-down—difference between opening and closing pressure).

(7) Rated capacity _____ pounds per hour (in accordance with § 162.001–8 and with the valve adjusted for blow-down given in § 162.001–6).

(8) Capacity lift _____ in. (vertical distance the valve disk rises under the action of the steam when the valve is discharging at the rated capacity).

(b) The valve manufacturer shall securely attach to the valve or on the spring a data plate on which shall be stamped the spring number and the minimum and maximum pressure to which the spring may be adjusted.

§ 162.001–8 *Flow rating tests.* (a) The maximum rated capacity of a safety valve shall be determined by actual steam flow at a pressure of 3 percent in excess of that at which the valve is set to blow and adjusted to have a blow-down in accordance with the requirements of § 162.001–6. The rated capacity with which the valve will be credited shall be 90 percent of that determined by the flow tests.

(b) (1) Tests shall be made to determine the lift, popping pressure, blow-down, and capacity at 3 different pressures for each of 3 representative sizes of each design or type of safety valve.

(2) A coefficient of discharge shall be determined for each test as follows:

$$K_D = \frac{\text{Actual steam flow}}{\text{Theoretical steam flow}} \quad (1)$$

(3) The average coefficient, K, of the nine tests shall be taken as the coefficient of the design. The individual coefficient K_D as determined by 9 tests shall fall within a range of plus or minus 10 percent of the average coefficient K.

(4) The average coefficient, K, shall be used for determining the relieving capacity for all sizes and pressures of the design of seat as used in the following formulas:

(i) For 45° seat:

$$W = (51.45 \times \pi\ DLP \times 0.707 \times K)\ 0.90^{1} \quad (2)$$

(ii) For flat seat:

$$W = (51.45 \times \pi\ DLP \times K)\ 0.90 \quad (3)$$

(iii) For nozzle:

$$W = (51.45 \times AP \times K)\ 0.90 \quad (4)$$

where:

W = weight of steam, pounds per hour.[2]
D = seat diameter, in inches.
L = lift, in inches.
P = flow pressure, in pounds per square inch, absolute (1.03 x set pressure) + 14.7.
K = average coefficient of discharge.
A = nozzle throat area, in square inches.

(c) A certified test report shall be submitted by the valve manufacturer, which shall include the lift of the valve at the rated capacity, popping pressure, closing or reseat pressure, blow-down and a table of relieving capacities for each size of valve for which approval is requested.

§ 162.001–9 *Procedure for approval—*(a) *General.* Safety valves intended for use on power boilers and on unfired steam generators installed on vessels subject to Coast Guard inspection shall be approved by the Commandant, U. S. Coast Guard, Washington 25, D. C.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of safety valve shall submit drawings in quadruplicate clearly showing the design of same together with the material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for reapproval.

(c) *Pre-approval tests.* (1) Before approval is granted, manufacturers shall have flow tests conducted in accordance with § 162.001–8 or submit evidence that such tests have been conducted and approved by the National Board of Boiler and Pressure Vessel Inspectors, or by a properly supervised and inspected test laboratory acceptable to the Commandant.

[1] The valve will be credited with only 90 percent of the capacity determined using the average coefficient in the above formulae.

[2] The theoretical steam flow is calculated in accordance with Napier's formula.

(2) Reports of conducted tests on designs of safety valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

SUBPART 162.012—SAFETY VALVES (STEAM HEATING BOILERS)

§ 162.012–1 *Applicable specifications.* (a) There are no other specifications applicable to this subpart except as noted in this subpart.

§ 162.012–2 *Scope.* This specification covers requirements for the design, construction and testing of safety valves intended for use on steam heating boilers, unfired steam generators and reduced-pressure steam lines, designed for pressures not exceeding 30 p. s. i. and installed on merchant vessels subject to inspection by the Coast Guard.

§ 162.012–3 *Materials.* (a) The materials used in the manufacture of safety valves shall conform to the applicable requirements of Subchapter F (Marine Engineering), except as otherwise specified in this subpart.

(b) Bodies of safety valves may be made of forged steel, cast steel, malleable iron, cast iron, cast bronze, or of such other equivalent material as may be approved by the Commandant.

(c) The seats and disks shall be of suitable corrosion resistant material. Seats or disks of cast iron or mallable iron are prohibited. Springs shall be of best quality spring steel consistent with the design of the valve and the service requirements.

(d) Non-metallic material except for gaskets and packing is not permitted in the construction of the safety valves, as pressure parts.

§ 162.012–4 *Construction and workmanship.* (a) Safety valves shall be of the direct spring-loaded pop type, or of such other type as may be approved by the Commandant. Lever or weight-loaded safety valves are prohibited.

(b) The nominal size of a safety valve shall be the inside diameter of the inlet opening to the individual valve disk. No safety valve shall be smaller than ¾ inch nor larger than 4 inches nominal pipe size. Safety valves shall have flanged, welding end or screwed inlet and outlet connections. The inlet opening shall have an inside diameter equal to or greater than the seat diameter.

(c) All safety valves shall be so constructed that the failure of any part cannot obstruct the free and full discharge of steam from the valve.

(d) Safety valves shall be of the angle type fitted with side outlet discharge connections.

(e) Safety valves shall be constructed so that no shocks detrimental to the valve or boiler are produced when lifting or closing. Safety valves shall be designed to pop open instantly and reach full lift and capacity at the maximum accumulation. Valve closure after popping shall be clean and sharp. Safety valves shall operate satisfactorily without wiredrawing and chattering at any stage of operation.

(f) (1) Springs shall be so designed that they will not be compressed solid

when the valve is discharging at the maximum rated relieving capacity.

(2) Springs used in safety valves shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(3) Springs of safety valves except those for use on boilers set at 15 pounds per square inch may be reset for any pressures not more than 10 percent above or 10 percent below that for which the valve is marked. The springs of safety valves of boilers set at 15 pounds per square inch shall not be reset at a higher pressure after they are adjusted by the manufacturer.

(g) Each safety valve shall have a suitable lifting device which will positively lift the disk from its seat at least 1/16 inch when there is no pressure on the boiler.

(h) Safety valves of 1½ inches size and below shall be tapped for not less than ⅛-inch pipe and safety valves above 1½ inches size shall be tapped for not less than ¼-inch pipe size drain at the lowest point where liquid can collect.

§ 162.012–5 *Marking.* (a) Each safety valve shall be plainly marked by the manufacturer in such a way that the markings will not be obliterated in service. The markings may be stamped or cast on the valve body or stamped or cast on a plate securely fastened to the body, and shall contain the following information:

(1) The name or identifying trademark of the manufacturer.

(2) Manufacturer's design or type number.

(3) Size _____ inches.
(The pipe size of the valve inlet)

(4) Set pressure _____ p. s. i.

(5) Rated capacity_____ pounds per hour.

§ 162.012–6 *Flow rating tests.* (a) (1) The maximum rated capacity of safety valves shall be determined by actual steam flow at the following flow pressures:

(i) For set pressures not exceeding 15 p. s. i.—at 5 p. s. i. over the set pressure.

(ii) For set pressures exceeding 15 p. s. i.—at 3 percent over the set pressure.

(2) The tests shall be made with steam and in a manner closely approximating actual operating conditions of steam boilers. The rated capacity with which the valve will be credited shall not exceed 90 percent of the flow capacity determined by the flow tests.

(b) (1) Tests shall be made to determine the lift, popping and blow-down pressures, and the capacity of at least 3 valves each of 3 representative sizes of each design or type.

(2) A coefficient of discharge shall be established for each test as follows:

$$K_D = \frac{\text{Actual steam flow}}{\text{Theoretical steam flow}} \quad (1)$$

(3) The average coefficient, K, of the tests required shall be taken as the coefficient of the design. The individual coefficient K_D as determined by the nine tests shall fall within a range of plus or minus 10 percent of the average coefficient K.

(4) The average coefficient K shall be used for determining the relieving capacity of all sizes and pressures of the design in the following formulas:

(i) For 45° seat:

$$W = (51.45 \times \pi DLP \times 0.707 \times K)\ 0.90^1 \quad (2)$$

(ii) For flat seat:

$$W = (51.45 \times \pi DLP \times K)\ 0.90 \quad (3)$$

(iii) For nozzle:

$$W = (51.45 \times AP \times K)\ 0.90 \quad (4)$$

where:

W = weight of steam, in pounds per hour.[2]
D = seat diameter, in inches.
L = lift, in inches.
P = absolute flow pressure, in pounds per square inch absolute (flow pressure +14.7).
K = average coefficient of discharge.
A = nozzle throat area, in square inches.

(c) When manufacturers desire to submit for approval safety valves of one or more sizes of a design set at one pressure, three valves of each size of each design set at one pressure may be submitted for flow testing and the maximum rated capacity shall be 90 percent of the minimum capacity of the three valves tested.

(d) Manufacturers may submit four valves of each combination of pipe size and orifice size for test. These four valves shall be set at pressures which will cover the approximate range of pressure for which the valves will be used with at least one valve set at 30 pounds per square inch. The capacities as determined by these four tests shall be plotted against the absolute accumulation test pressure and a curve drawn through these four points. If the four points do not establish a reasonable curve, the authorized observers shall require additional valves tested. From this curve the relieving capacities shall be obtained and the maximum rated capacity shall be 90 percent of the capacity taken from the curve.

(e) Where an average coefficient of discharge cannot be determined, the flow test prescribed in paragraph (c) or (d) of this section shall be used.

(f) A certified test report shall be submitted by the valve manufacturer, which shall include the lift of the valve at the rated capacity, popping pressure, closing or reseat pressure, and a table of relieving capacities for each size of valve for which approval is desired.

§ 162.012–7 *Procedure for approval—*(a) *General.* Safety valves intended for use on heating boilers and unfired steam generators installed on vessels subject to Coast Guard inspection shall be approved by the Commandant, U. S. Coast Guard, Washington 25, D. C.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of safety valve shall submit drawings in quadruplicate clearly showing the design of same together with material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for reapproval.

(c) *Pre-approval tests.* (1) Before approval is granted manufacturers shall have flow tests conducted in accordance with § 162.012–6 or submit evidence that such tests have been conducted and approved by the National Board of Boiler and Pressure Vessel Inspectors, or by a properly supervised and inspected test laboratory acceptable to the Commandant.

(2) Reports of conducted tests on designs of safety valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

[1] The valve will be credited with only 90 percent of the capacity determined using the average coefficient in the above formula.

[2] The theoretical steam flow is calculated in accordance with Napier's formula.

SUBPART 162.013—RELIEF VALVES (HOT WATER HEATING BOILERS)

§ 162.013–1 *Applicable specifications.* (a) There are no other specifications applicable to this subpart except as noted in this subpart.

§ 162.013–2 *Scope.* (a) This specification covers requirements for the design, construction and testing of relief valves on hot water heating boilers designed for pressure not exceeding 30 p. s. i. and installed on merchant vessels subject to inspection by the Coast Guard.

§ 162.013–3 *Materials.* (a) The materials used in the manufacture of relief valves shall conform to the applicable requirements of Subchapter F (Marine Engineering), except as otherwise specified in this subpart.

(b) Bodies of relief valves may be made of forged steel, cast steel, malleable iron, cast iron, or cast bronze, or of such other equivalent material as may be approved by the Commandant.

(c) The seats and disks shall be of material suitable to resist corrosion. Seats and disks of cast iron or malleable iron shall not be used. Non-metallic materials may be used in the construction of relief valves where approved by the Commandant, provided such materials are not susceptible to failure due to deterioration or vulcanization when subjected to temperatures not exceeding 275 degrees F.

(d) Springs shall be of best quality steel consistent with the design of the valve and the service requirement.

§ 162.013–4 *Construction and workmanship.* (a) Relief valves shall be of the spring-loaded type without guide disks on the pressure side of the valve, or of such other type as may be approved by the Commandant. Lever or weight-loaded relief valves are prohibited.

(b) The nominal size of a relief valve shall be the inside diameter of the inlet opening to the individual valve disk. No relief valve shall be smaller than ¾ inch nor larger than 4 inches nominal pipe size. The inlet opening shall have an inside diameter equal to or greater than the seat diameter. In no case shall the minimum opening through any part of the valve be less than ¼ inch diameter or its equivalent area.

(c) All relief valves shall be so constructed that the failure of any part

cannot obstruct the free and full discharge of liquid from the valve.

(d) Relief valves shall be of the angle type fitted with side outlet connections.

(e) (1) Springs shall be so designed that they will not be compressed solid when the valve is discharging at the maximum rated relieving capacity.

(2) Springs used in relief valves shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(3) Springs shall not be reset for any pressures more than 10 percent above or 10 percent below that for which the valve is marked.

(f) Each relief valve shall have a suitable lifting device which will positively lift the disk from its seat at least $\frac{1}{8}$ inch when there is no pressure on the boiler.

(g) Relief valves shall be so constructed that no shocks detrimental to the valve or boiler are produced when lifting or closing. The relief valves shall operate without pounding or pulsation and shall not chatter at any stage of operation.

§ 162.013–5 *Marking.* (a) Each relief valve shall be plainly marked in such a way that the markings will not be obliterated in service. The markings may be stamped or cast on the valve body or stamped or cast on a plate securely fastened to the body, and shall contain the following information:

(1) The name or identifying trademark of the manufacturer.

(2) Manufacturer's design or type number.

(3) Size . . . . . inches.
(The nominal pipe size of the valve inlet)

(4) Set pressure . . . . . p. s. i.

(5) Rated capacity . . . B. t. u. per hr.

§ 162.013–6 *Flow rating tests.* (a) The maximum rated capacity of relief valves shall be determined by actual steam flow at a flow pressure of 10 percent over the set pressure but not less than 3 pounds per square inch. The tests shall be made with steam, and in a manner closely approximating actual operating conditions of steam boilers. For determining the B. t. u. discharge of relief valves for hot-water boilers, the weight of steam in pounds per hour shall be multiplied by 1,000.

(b) (1) For relief valves with metallic disks, tests shall be made to determine the popping and blow-down pressures, and capacity of at least 3 valves each of 3 representative sizes of each design or type.

(2) A coefficient of discharge shall be established for each test as follows:

$$K_D = \frac{\text{Actual steam flow}}{\text{Theoretical steam flow}} \quad (1)$$

(3) The average coefficient, K, of the tests required shall be taken as the coefficient of the design. The individual coefficients K_D as determined by the 9 tests shall fall within a range of plus or minus 10 percent of the average coefficient K.

(4) The average coefficient K shall be used for determining the relieving capacity of all sizes and pressures of the design in the following formulas:

(i) For 45° seat:

$$W = (51.45 \times \pi DLP \times 0.707 \times K) \quad 0.90^{1} \quad (2)$$

(ii) For flat seat:

$$W = (51.45 \times \pi DLP \times K) \quad 0.90 \quad (3)$$

(iii) For nozzle:

$$W = (51.45 \times AP \times K) \quad 0.90 \quad (4)$$

where:

W = Weight of steam, in pounds per hour.[2]
D = Seat diameter, in inches.
L = Lift, in inches.
P = Absolute flow pressure, in pounds per square inch, absolute (flow pressure +14.7).
K = Average coefficient of discharge.
A = Nozzle throat area, in square inches.

(5) The maximum rated capacity that may be stamped on the valve shall not exceed 90 percent of the value determined by the flow tests.

(c) When manufacturers desire to submit for approval relief valves of one or more sizes of a design set at one pressure, three valves of each size of each design set at one pressure may be submitted for flow testing and the maximum rated capacity shall be 90 percent of the minimum capacity of the three valves tested.

(d) Manufacturers may submit four valves of each combination of pipe size and orifice size for test. These four valves shall be set at pressures which will cover the approximate range of pressure for which the valves will be used with at least one valve set at 30 pounds per square inch. The capacities as determined by these four tests shall be plotted against the absolute accumulation test pressure and a curve drawn through these four points. If the four points do not establish a reasonable curve, the authorized observers shall require additional valves tested. From this curve the relieving capacities shall be obtained and the stamped capacity shall be 90 percent of the capacity taken from the curve.

(e) For relief valves with non-metallic disks or where an average coefficient of discharge cannot be determined, the flow test prescribed in paragraph (c) or (d) of this section shall be used.

(f) A certified test report shall be submitted by the valve manufacturer, which shall include the lift of the valve at the rated capacity, popping pressure, closing or reseat pressure, and a table of relieving capacities for each size of valve for which approval is desired.

§ 162.013–7 *Procedure for approval—*(a) *General.* Relief valves for use on hot water heating boilers installed on vessels subject to Coast Guard inspection shall be approved by the Commandant, U. S. Coast Guard, Washington 25, D. C.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of relief valve shall submit drawings in quadruplicate clearly showing the design of same together with material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for reapproval.

(c) *Pre-approval tests.* (1) Before approval is granted, manufacturers of relief valves shall have flow tests conducted in accordance with § 162.013–6 or submit evidence that such tests have already been conducted and approved by the National Board of Boiler and Pressure Vessel Inspectors, or by a properly supervised and inspected test laboratory acceptable to the Commandant.

(2) Reports of conducted tests on designs of relief valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

SUBPART 162.018—SAFETY RELIEF VALVES, LIQUEFIED COMPRESSED GAS

§ 162.018–1 *Applicable specifications.* (a) There are no other specifications applicable to this subpart except as noted in this subpart.

§ 162.018–2 *Scope.* (a) This specification covers requirements for the design, construction and testing of safety relief valves intended for use on unfired pressure vessels containing liquefied compressed gases installed on merchant vessels subject to inspection by the Coast Guard.

§ 162.018–3 *Materials.* (a) The materials used in the manufacture of safety relief valves shall conform to the applicable requirements of Subchapter F (Marine Engineering) of this chapter, except as otherwise specified in this subpart, and shall be resistant to the corrosive or other action of the liquefied compressed gas in the liquid or gas phase.

(b) Non-metallic materials shall not be used for any pressure containing parts of valves, except as may be approved for bonnet gaskets and valve seat seals. Nonferrous materials melting below 1,500 degrees F. shall not be used for liquefied inflammable gas service. Flange gaskets shall be metal or spiral wound asbestos.

(c) Nonferrous materials shall not be used in the construction of valves for anhydrous ammonia or other service where susceptible to attack by the lading.

(d) The seats and disks shall be of suitable corrosion resistant material. Seats and disks of cast iron or malleable iron shall not be used. Springs shall be of best quality spring steel consistent with the design of the valve and the service requirement.

§ 162.018–4 *Construction and workmanship.* (a) Safety relief valves shall be of either the internal or external spring-loaded type, suitable for the intended service.

(b) Safety relief valve body, base, bonnet and internals shall be designed for a pressure of not less than the set-pressure of the valve.

(c) All safety relief valves shall be so constructed that the failure of any part cannot obstruct the free and full discharge of vapors from the valve.

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[1] The valve will be credited with only 90 percent of the capacity determined using the average coefficient in the above formula.

[2] The theoretical steam flow is calculated in accordance with Napier's formula.

(d) The nominal size of a safety relief valve shall be the inside diameter of the inlet opening to the individual valve disk. No safety relief valve shall be smaller than ¾ inch nor larger than 6 inches. Safety relief valves shall have flanged or welded end inlet connections and either flanged or screwed outlet connections, except outlets exceeding 4 inches in diameter shall be flanged.

(e) Safety relief valves shall be of the angle or straight-through type, fitted with side or top outlet discharge connections.

(f) (1) Springs shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(2) Springs may not be re-set for any pressure more than 10 percent above or 10 percent below that for which the valve is marked.

(3) If the operating conditions of a valve are changed so as to require a new spring under subparagraph (2) of this paragraph for a different pressure, the valve shall be adjusted by the manufacturer or his authorized representative.

(g) The design and construction of safety relief valves shall permit easy access for inspection and repair.

(h) Safety relief valves shall be tapped for not less than ¼ inch pipe size drain at the lowest practicable point where liquid can collect.

§ 162.018–5 *Blow-down adjustment and popping tolerance.* (a) Safety relief valves shall be so constructed that no shocks detrimental to the valve or pressure vessel are produced when lifting or closing. Safety relief valves shall be designed to open sharply and reach full lift and capacity at the maximum accumulation. Valve closure after popping shall be clean and sharp. Safety relief valves shall operate satisfactorily without wiredrawing and chattering at any stage of operation.

(b) Safety relief valves having adjustible blow-down construction shall be adjusted to close after blowing down not more than 5 percent of the set pressure. Valves shall be adjusted to pop within a tolerance of plus or minus 3 percent of the set pressure, except that for pressures of 70 p. s. i. and below, the tolerance in popping pressure shall not vary more than plus or minus 2 p. s. i.

§ 162.018–6 *Marking.* (a) Each safety relief valve shall be plainly marked by the manufacturer with the required data in such a way that the marking will not be obliterated in service. The marking may be stamped on the valve or stamped or cast on a plate securely fastened to the valve. The marking shall include the following data:

(1) The name or identifying trademark of the manufacturer.

(2) Manufacturer's design or type number.

(3) Size_____inches.
(The pipe size of the valve inlet)

(4) Set pressure_____p. s. i.

(5) Rated capacity_____cubic feet per minute of the gas or vapor (at 60° F. and 14.7 p. s. i. a.)

§ 162.018–7 *Flow rating tests.* (a) The maximum rated capacity of safety relief valves shall be determined at a flow pressure not to exceed 110 percent of the set pressure. The flow tests may be conducted on steam, air, or natural gas.

(b) Tests shall be made on valves to determine the start-to-discharge pressure, popping pressure, reseat pressure, lift, and relieving capacity for each size, design, and pressure setting of a set of three (3) safety relief valves selected at random from production. The test runs on the sample valves shall be conducted for each pressure setting designed, and the maximum rated capacity for each combination of design, size and test pressure shall be the smallest capacity rating of the 3 valves tested. The capacity ratings of a set of 3 valves shall fall within a range of 10 percent of the highest capacity.

(c) (1) In lieu of the individual capacity certification tests as provided in paragraph (b) of this section, an average coefficient of discharge may be established for a specific valve design. The manufacturer shall submit for such tests at least 3 valves for each of 3 different sizes for each design (a total of 9). Each valve of a given size shall be set at a different pressure. Tests shall be made on each safety relief valve to determine its popping pressure, blow-down pressures and actual capacity in terms of the vapor or gas in the test.

(2) A coefficient of discharge (K_D) shall be established for each test run as follows:

$$K_D = \frac{\text{Actual flow}}{\text{Theoretical flow}} \quad (1)$$

where "actual flow" is determined quantitatively by test, and "theoretical flow" is calculated by the appropriate formula which follows:

(i) For test with dry saturated steam:

(*a*) For 45° seat:

$$W = 51.45 \times \pi DLP \times 0.707 \quad (2)$$

(*b*) For flat seat:

$$W = 51.45 \times \pi DLP \quad (3)$$

(*c*) For nozzle:

$$W = 51.45 \times AP \quad (4)$$

(ii) For test with air:

$$Q = 418 \frac{AP}{\sqrt{T}} \quad (5)$$

(iii) For test with any gas or vapor:

$$Q = CAP \frac{V}{60} \sqrt{\frac{M}{T}} \quad (6)$$

where:

W = theoretical steam flow, in pounds per hour.[1]

Q = theoretical flow of the gas, in cubic feet per minute.

D = seat diameter, in inches.

A = actual discharge area through the valve, at developed lift, in square inches.

L = lift, in inches.

P = maximum accumulation pressure, pounds per square inch absolute (set pressure × 1.10 + 14.7).

[1] The theoretical steam flow is calculated in accordance with Napier's formula.

M = molecular weight of the fluid (see Table 162.018–6 (c) (1)).

V = specific volume of the gas, at 60° F. and 14.7 p. s. i. (see Table 162.018–6 (c) (1)).

T = absolute temperature at inlet (degrees F. plus 460).

C = constant for gas or vapor based on ratio of specific heats (k) at standard conditions.

$$C = 520\sqrt{k\left(\frac{2}{k+1}\right)^{\frac{k+1}{k-1}}}$$ (For values of C, see Table 162.018–6 (c) (2)).

k = ratio of specific heats $\frac{C_P}{C_V}$ (See Table 162.018–6 (c) (1)).

C_P = specific heat at constant pressure.

C_V = specific heat at constant volume. (See Table 162.018–6 (c) (1)).

(3) The lowest of the coefficients K_D of the nine tests required shall be taken as the coefficient K of that design.

(4) The relieving capacity of all sizes and pressures of a given design for which K has been established under the provisions of this paragraph, that are manufactured subsequently shall then be calculated by the appropriate formula in paragraph (c) (2) of this section multiplied by the coefficient K.

TABLE 162.018–6 (c) (1) PHYSICAL PROPERTIES OF GASES AND VAPORS

Gas or vapor	Molecular weight (M)	Ratio of specific heats (k) at 14.7 p. s. i. a. & 60° F.	Specific volume (V) at 60° F. and 14.7 p. s. i. a. cu. ft. per pound
Air	28.97	1.41	13.10
Anhydrous ammonia	17.03	1.31	21.95
Butane	58.12	1.11	6.30
Carbon dioxide	44.01	1.30	8.55
Chlorine	70.91	1.35	5.27
Ethane	30.07	1.22	12.48
Ethylene	28.05	1.18	13.43
Hydrogen sulfide	34.08	1.32	11.00
Nitrous oxide	44.02	1.30	8.54
Propane	44.09	1.13	8.45
Propylene	42.08	1.15	8.88
Sulfur dioxide	64.06	1.29	5.77

TABLE 162.018–6 (c) (2) CONSTANT (C) FOR GAS OR VAPOR RELATED TO RATIO OF SPECIFIC HEATS $k = \frac{C_P}{C_V}$

k	Constant C	k	Constant C
1.00	315	1.38	354
1.02	318	1.40	356
1.04	320	1.42	358
1.06	322	1.44	359
1.08	324	1.46	361
1.10	327	1.48	363
1.12	329	1.50	364
1.14	331	1.52	366
1.16	333	1.54	368
1.18	335	1.56	369
1.20	337	1.58	371
1.22	339	1.60	372
1.24	341	1.62	374
1.26	343	1.64	376
1.28	345	1.66	377
1.30	347	1.68	379
1.32	349	1.70	380
1.34	351	2.00	400
1.36	352	2.20	412

(d) After completion of the required relieving capacity tests, manufacturers shall submit a certified test report which shall include the lift of the valve at the rated capacity, popping pressure, reseat pressure, and a table of relieving capaci-

ties for each size of valve for which approval is desired. The relieving capacities shall be calculated in terms of free air or gas measured at or corrected to the standard conditions of 60 degrees F., and atmospheric pressure (14.7 p. s. i. a.).

(e) Safety valves previously tested and approved under the provisions of Subpart 162.001 of this subchapter with capacity ratings at 103 percent of the set pressure may be accepted as complying with the requirements of this subpart without further test. The maximum capacity ratings of such valves may be increased by the multiplier, m, as determined by formula (7), to allow for a flow test pressure of 110 percent of the set pressure.

$$m=\frac{1.10P+14.7}{1.03P+14.7} \qquad (7)$$

where:

m=multiplier.

P=set pressure, pounds per square inch gage.

§ 162.018–8 *Procedure for approval—*(a) *General.* Safety relief valves for use on unfired pressure vessels containing liquefied compressed gases shall be approved by the Commandant, U. S. Coast Guard, Washington 25, D. C.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of safety relief valve shall submit in quadruplicate detail drawings showing the valve construction, and material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for reapproval.

(c) *Pre-approval tests.* (1) Prior to approval of safety relief valves by the Commandant, manufacturers shall have capacity certification tests conducted, in accordance with § 162.018–7 or submit satisfactory evidence that such tests have been conducted and approved by The National Board of Boiler and Pressure Vessel Inspectors, or by a properly supervised and inspected test laboratory acceptable to the Commandant.

(2) Reports of conducted tests on designs of safety relief valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

Subchapter R—Nautical Schools

Chapter I, Subchapter R, is amended by adding a new part 166 reading as follows:

Part 166—Designation and Approval of Nautical School Ships

Sec.

166.01 Approval of nautical school ships.
166.05 Course of study for deck students.
166.10 Course of study for engineering students.
166.15 Training for maintenance of discipline; ship sanitation; fire and lifeboat drills.
166.20 Applicants for certificates; when eligible for examination.

Authority: §§ 166.01 to 166.20 issued under sec. 13, 38 Stat. 1169, as amended, sec. 7, 49 Stat. 1936, as amended; 46 U. S. C. 672, 689.

§ 166.01 *Approval of nautical school ships.* (a) Under the provisions of section 13 of the act of March 4, 1915 (38 Stat. 1169; 46 U. S. C. 672), as amended by section 1 of the act of June 25, 1936 (49 Stat. 1930; 46 U. S. C. 672), and the act of May 22, 1937 (50 Stat. 199; 46 U. S. C. 672), graduates of school ships approved by and conducted under rules prescribed by the Commandant may be rated able seamen or qualified members of the engine department.

(b) It has been made to appear to the satisfaction of the Commandant that the school ships operated by the States in which they are located, namely, by the California Maritime Academy, Maine Maritime Academy, Massachusetts Maritime Academy, and New York State Maritime College; the United States Merchant Marine Academy; the United States Naval Academy, and the United States Coast Guard Academy; have adopted a course of study for their students complying with the rules prescribed by the Commandant, and a system of regulations adequate to equip the deck and engineering students theoretically and physically in the rudiments of seamanship and navigation necessary to qualify the graduates for the rating of able seamen and in all the branches of marine engineering necessary to qualify the graduates for the rating of qualified members of the engine department, respectively.

(c) The school ships operated by the State organizations and the Federal academies named in paragraph (b) of this section are hereby approved and their graduates, if meeting the other qualifications required by law and regulations promulgated thereunder, are entitled to the rating of able seamen or qualified members of the engine department and to be certified as such.

(d) A graduate of any of those school ships, if meeting the other qualifications required by law and regulations promulgated thereunder, is also entitled to the rating of lifeboatman and to be certified as such.

§ 166.05 *Course of study for deck students.* The course of study for deck students shall include (a) all the instructions in the rudiments of seamanship and navigation necessary to equip the student fully with the theoretical knowledge required for the proper discharge of the duties developing upon able seaman; (b) a thorough practical training in the mechanics of all operations incident to the sailing and management of a vessel insofar as such operations form a part of the duties of able seamen.

§ 166.10 *Course of study for engineering students.* The course of study for engineering students shall include (a) all the instruction necessary to fully equip the student with the theoretical knowledge required for the proper discharge of the duties developing upon qualified members of the engine department; (b) a thorough practical training in the mechanics of all operations incident to the sailing and management of a vessel insofar as such operations form a part of the duties of qualified members of the engine department.

§ 166.15 *Training for maintenance of discipline; ship sanitation; fire and lifeboat drills.* All students shall be trained to obey all lawful orders emanating from their superior officers and schooled in the rules of conduct to be observed in order that proper discipline may be maintained on shipboard. They shall also be instructed in the fundamentals of ship sanitation as prescribed by law and regulations, and shall be given intensive instruction and practical training in all the operations incident to fire and lifeboat drills, both in port and at sea.

§ 166.20 *Applicants for certificates; when eligible for examination.* Applicants for certificates as able seamen will be eligible for examination after they have completed a course of study as outlined in §§ 166.05, 166.15, and applicants for certificates as qualified members of the engine department after they have completed a course of study as outlined in §§ 166.10, 166.15.

Part 167—Public Nautical School Ships

Subpart 167.20—Hull Requirements, Construction and Arrangement of Nautical School Ships

1. Section 167.20–17 is amended to read as follows:

§ 167.20–17 *Bilge pumps, bilge piping and sounding arrangements.* The number, capacity, and arrangement of bilge pumps and bilge piping shall be in accordance with the requirements for cargo vessels contained in Parts 50 to 61 of Subchapter F (Marine Engineering) of this chapter. Sounding pipes shall be fitted in each compartment, except those accessible at all times. The main and secondary drain systems installed in accordance with U. S. Navy or U. S. Coast Guard Construction Specifications shall be accepted as meeting the intent of this section.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Subpart 167.25—Marine Engineering

2. Section 167.25–1 (a) (1) is amended to read as follows:

§ 167.25–1 *Boilers, pressure vessels, piping and appurtenances.* (a) • • •

(1) Marine engineering regulations and material specifications in Parts 50 to 61, inclusive, of Subchapter F (Marine Engineering) of this chapter.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

3. Section 167.25–5 is amended to read as follows:

§ 167.25–5 *Inspection of boilers, pressure vessels, piping and appurtenances.* The inspection of boilers, pressure vessels, piping and appurtenances shall be in accordance with the appropriate sections in Parts 50 to 61, inclusive, of Subchapter F (Marine Engineering) of this chapter, insofar as they relate to tests and inspection of cargo vessels.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

SUBPART 167.40—CERTAIN EQUIPMENT REQUIREMENTS

1. Section 167.40–1 (a) (2) is amended to read as follows:

§ 167.40–1 *Electrical installations.* (a) * * *

(2) U. S. Coast Guard electrical engineering requirements in Subchapter J (Electrical Engineering) of this chapter.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

2. Section 167.40–35 (b) is amended to read as follows:

§ 167.40–35 *Motion-picture projectors.* (a) * * *

(b) Motion-picture projectors using the 35 mm. size, unless mounted on weather deck shall be used in booths, in accordance with § 72.05–60 (a) (1) and (2) of Subchapter H (Passenger Vessels) of this chapter or applicable Navy specifications.

(R. S. 4405, as amended, 4462, as amended; 46 U. S. C. 375, 416)

Chapter I is amended by adding a new Part 168 to Subchapter R reading as follows:

PART 168—CIVILIAN NAUTICAL SCHOOL VESSELS

SUBPART 168.01—AUTHORITY AND PURPOSE

Sec.
168.01–1 Purpose of regulations.
168.01–5 Assignment of functions.
168.01–10 Authority for regulations.

SUBPART 168.05—GENERAL REQUIREMENTS

168.05–1 Application of passenger vessel inspection laws.
168.05–5 Application of passenger vessel inspection regulations.

SUBPART 168.10—DEFINITIONS OF TERMS USED IN THIS PART

168.10–1 Vessel.
168.10–5 Civilian nautical school.

SUBPART 168.15—ACCOMMODATIONS

168.15–1 Intent.
168.15–5 Location.
168.15–10 Construction.
168.15–15 Size.
168.15–20 Equipment.
168.15–25 Washrooms.
168.15–30 Toilet rooms.
168.15–35 Hospital space.
168.15–40 Lighting.
168.15–45 Heating.
168.15–50 Ventilation.
168.15–55 Screening.
168.15–60 Inspection.

AUTHORITY: §§ 168.01–1 to 168.15–60 issued under sec. 3, 54 Stat. 346, as amended; 46 U. S. C. 1333.

SUBPART 168.01—AUTHORITY AND PURPOSE

§ 168.01–1 *Purpose of regulations.* (a) The purpose of the regulations in this part is to set forth uniform minimum requirements for vessels, whether being navigated or not, which are used by or in connection with any civilian nautical school, except vessels of the Navy or Coast Guard.

§ 168.01–5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bureau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950, effective July 31, 1950, the functions formerly vested in the Commandant, United States Coast Guard were transferred to the Secretary of the Treasury with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 168.01–10 *Authority for regulations.* (a) The authority to prescribe regulations is in section 3 of the act of June 12, 1940, as amended (sec. 3, 54 Stat. 346, 46 U. S. C. 1333).

SUBPART 168.05—GENERAL REQUIREMENTS

§ 168.05–1 *Application of passenger vessel inspection laws.* (a) All laws covering the inspection of passenger vessels are hereby made applicable to all vessels or other floating equipment used by or in connection with any civilian nautical school, whether such vessels or other floating equipment are being navigated or not, except vessels of the Navy or Coast Guard.

§ 168.05–5 *Application of passenger vessel inspection regulations.* (a) Where the requirements are not covered specifically in this part, all the regulations applying to passenger vessels in Subchapter E (Load Lines), F (Marine Engineering), H (Passenger Vessels), J (Electrical Engineering), P (Manning), and Q (Specifications) are hereby made applicable to all vessels or other floating equipment used by or in connection with any civilian nautical school, whether such vessels or other floating equipment are being navigated or not, except vessels of the Navy or Coast Guard.

SUBPART 168.10—DEFINITIONS OF TERMS USED IN THIS PART

§ 168.10–1 *Vessel.* (a) The term "vessel" means any vessel, whether being navigated or not, which is used by or in connection with any civilian nautical school, except vessels of the Navy or Coast Guard.

§ 168.10–5 *Civilian nautical school.* (a) The term "civilian nautical school" means any school or branch thereof operated and conducted in the United States (except State nautical schools and schools operated by the United States or any agency thereof) which offers to persons quartered on board any vessel instruction for the primary purpose of training for service in the merchant marine.

SUBPART 168.15—ACCOMMODATIONS

§ 168.15–1 *Intent.* (a) It is the intent of this subpart to provide minimum standards for the size, ventilation, plumbing, and sanitation of quarters assigned to the members of the crew, passengers, cadets, students, instructors, or any other persons at any time quartered on board any such vessel.

§ 168.15–5 *Location.* (a) Quarters shall be located so that sufficient fresh air and light are obtainable compatible with accepted practice or good arrangement and construction.

(b) Quarters shall not be located forward of the collision bulkhead, nor shall such section or sections of any deck occupied by quarters be below the deepest load line except in special cases which may be approved by the Commandant, U. S. Coast Guard.

§ 168.15–10 *Construction.* (a) All quarters are to be efficiently constructed in a manner suitable to the purpose for which they are intended. Bulkheads separating accommodations from cargo and machinery spaces, lamp, paint, storerooms and drying rooms, washrooms and toilet rooms are to be efficiently constructed and made odorproof when considered necessary by the Commandant, U. S. Coast Guard.

(b) Metal decks in living quarters are to be covered with deck covering composition as approved by the Commandant, U. S. Coast Guard so as to be cleaned readily and kept sanitary. Deck coverings in hospital, wash places, drying rooms, and toilet rooms are to be of suitable solid impervious material such as tile, cement, etc.

(c) All quarters are to be properly drained. Living accommodations are not to drain directly into washrooms or toilet rooms, each of which shall be drained separately.

(d) All washrooms and toilet rooms shall be properly drained and so constructed and arranged that they can be kept in a clean, workable, and sanitary condition. The scupper to the wash place must be of sufficient size and situated in the lowest part of the space.

§ 168.15–15 *Size.* (a) Sleeping accommodations shall be divided into rooms, no one of which shall berth more than 6 persons. The purpose for which each space is to be used and the number of persons it may accommodate, shall be marked.

(b) Each room shall be of such size that there are at least 20 square feet of deck area and a volume of at least 150 cubic feet for each person accommodated. In measuring sleeping quarters, any equipment contained therein is not to be deducted from the total volume or from the deck area.

§ 168.15–20 *Equipment.* (a) Each person shall have a separate berth and not more than 1 berth shall be placed above another. The berths shall be of metal framework and shall be so arranged that they provide ample room for easy occupancy. The over-all size of a berth shall not be less than 30 inches wide by 76 inches long. Where berths adjoin, they shall be divided by a partition not less than 18 inches in height. Where 2 tiers of berths are fitted, the bottom of the lower must not be less than 12 inches above the deck, and the bottom of the upper must not be less than 2 feet 6 inches both from the bottom of the lower and from the deck overhead. The berths shall not be obstructed by pipes, ventilating ducts, or other installations.

(b) A metal locker shall be provided for each person accommodated in a room. Each locker shall be not less than 18

inches by 21 inches by 60 inches high and so placed as to be readily accessible. The interior of the locker shall be so arranged as to facilitate the proper stowage of clothes.

§ 168.15–25 *Washrooms.* (a) There shall be provided 1 shower for each 10 persons or fraction thereof and 1 wash basin for each 6 persons or fraction thereof to be accommodated. The persons to be accommodated shall include all persons who do not occupy rooms to which private facilities are attached.

(b) All wash basins and showers shall be equipped with proper plumbing including hot and cold running fresh water. Wash basins may be located in the sleeping quarters if properly installed and equipped with proper plumbing.

§ 168.15–30 *Toilet rooms.* (a) There shall be provided 1 toilet for each 10 persons or fraction thereof to be accommodated. The persons to be accommodated shall include all persons who do not occupy rooms to which private facilities are attached.

(b) The toilet rooms shall be separate from the washrooms and shall be located convenient to the sleeping quarters of the persons to which they are allotted but shall not open directly into such quarters except when they are provided as private or semiprivate facilities.

(c) Where more than one toilet is located in a space or compartment, each toilet shall be separated by partitions. Such partitions shall be open at the top and bottom for ventilating and cleaning purposes.

(d) Urinals may be fitted if desired, but no reduction in the required number of toilets will be made therefor.

§ 168.15–35 *Hospital space.* (a) Each vessel shall be provided with a hospital space. This space shall be situated with due regard to the comfort of the sick so that they may receive proper attention in all weathers.

(b) The hospital shall be suitably separated from other spaces and shall be used for the care of the sick and for no other purpose.

(c) The entrance is to be of such width and in such a position as to admit a stretcher case readily. Berths are to be of metal and may be in double tier, provided the upper berth is hinged and arranged to be secured clear of the lower berth when not in use. At least one berth is to be so arranged that it can be made accessible from both sides when necessary.

(d) The hospital shall be fitted with berths in the ratio of 1 berth to every 12 persons, but the number of berths need not exceed 6. These berths, in their size and arrangement, shall comply with the provisions of § 168.15–20 (a).

(e) The hospital shall have a toilet, wash basin, and bath tub or shower conveniently located. Other necessary suitable equipment of a sanitary type such as clothes locker, table, seat, etc., shall be provided.

§ 168.15–40 *Lighting.* All quarters shall be adequately lighted. The minimum standard for natural lighting is that it will be possible on a clear day to read print such as that of an ordinary newspaper in any part of the clear working space. When it is not possible to provide adequate natural lighting, artificial lighting may be accepted on the same basis. Washrooms, toilet rooms, and hospital spaces are in particular to be well lighted.

§ 168.15–45 *Heating.* All quarters shall be adequately heated in a manner suitable to the purpose of the space. The method of heating may be by steam, hot water apparatus, a continuous supply of warm air, or other method approved by the Commandant, U. S. Coast Guard.

§ 168.15–50 *Ventilation.* (a) All quarters shall be adequately ventilated in a manner suitable to the purpose of the space and route of the vessel. The inlets shall be arranged to diffuse the inflow as widely as possible in order that the air shall be distributed without discomfort to the occupants.

(b) Except for such spaces as are located in deck houses where, under all ordinary weather conditions, the windows, ports, skylights, etc., and doors to passageways can be kept open, all spaces shall be ventilated by a mechanical system unless it can be shown that a natural system will meet the requirements outlined in paragraph (a) of this section.

(c) When washrooms are ventilated by a natural system, they may receive their supply of fresh air from well-ventilated passageways, but independent outlet ventilators must be fitted with an area of at least 10 square inches, exclusive of insect screening if fitted, for each 150 cubic feet of volume of the space ventilated.

(d) When toilet rooms are ventilated by a natural system, the fresh air must be supplied through independent inlet ventilators having a minimum area of 10 square inches, exclusive of insect screening if fitted, for each 150 cubic feet of volume of space ventilated. The outlet ventilators also must be independent to the open air and must be at least equal in size to the inlet ventilators.

(e) When mechanical ventilation is provided for sleeping rooms and messrooms, these spaces shall be supplied with fresh air equal to at least 10 times the volume of the room each hour and shall be so ventilated both at sea and in port when such spaces are occupied. The system shall be so designed that the impure air will exhaust in a satisfactory manner.

(f) When mechanical ventilation is provided for washrooms, toilet rooms, and hospital spaces, these spaces shall be fitted with exhaust ventilation to remove a volume of air equal to 10 times the volume of the space each hour and with adequate ventilation inlets so that it is possible to have these spaces properly ventilated when all doors and ports are closed.

§ 168.15–55 *Screening.* Provision shall be made to protect the quarters against the admission of insects by the fitting of suitable screens to ventilating skylights, airports, ventilators, and doors to the open deck.

§ 168.15–60 *Inspection.* (a) The Officer in Charge, Marine Inspection, shall inspect the quarters of every such vessel at least once in each month or at such time as the vessel shall enter an American port and shall satisfy himself that such vessel is in compliance with the regulations in this part.

(b) Whenever it shall be found that such vessel is not in compliance with the regulations in this part, the Officer in Charge, Marine Inspection, shall proceed as provided in section 4453 of the Revised Statutes of the United States, as amended (46 U. S. C. 435).

Subchapter S—Numbering Undocumented Vessels

Chapter I is amended by adding a new Subchapter S and Part 172 reading as follows:

PART 172—NUMBERING REQUIREMENTS

SUBPART 172.01—AUTHORITY AND PURPOSE

Sec.

172.01–1 Purpose of regulations.
172.01–5 Assignment of functions.
172.01–10 Authority for regulations.

SUBPART 172.05—APPLICATION

172.05–1 General.
172.05–5 Vessels required to be numbered.
172.05–10 Vessels not required to be numbered.

SUBPART 172.10—IDENTIFICATION REQUIREMENTS

172.10–1 Application for certificate of award of number.
172.10–5 Documentary evidence of ownership.
172.10–10 Issuance of certificate of award of number.
172.10–15 Certificate of award of number kept on board undocumented vessels.
172.10–20 Issuance of certificate of award of number to an alien.

SUBPART 172.15—NOTIFICATION OF CHANGES REQUIRED

172.15–1 Information required when changes occur.
172.15–5 Procedure upon change of permanent residence.

SUBPART 172.20—VESSEL IDENTIFICATION

172.20–1 Number assigned required on bow of undocumented vessel.
172.20–5 Style of numbers.
172.20–10 Color of numbers.

AUTHORITY: §§ 172.01–1 to 172.20–10, issued under sec. 1, 40 Stat. 602, as amended; 46 U. S. C. 288.

SUBPART 172.01—AUTHORITY AND PURPOSE

§ 172.01–1 *Purpose of regulations.* (a) The purpose of the regulations in this part is to set forth uniform requirements for the identification of undocumented vessels operated in whole or in part by machinery, owned in the United States and found on the navigable waters thereof, except public vessels and vessels not exceeding 16 feet in length temporarily equipped with detachable motors. The regulations in this part also describe the manner and method for issuing certificates of award of numbers for undocumented vessels and the administration of this part by the Coast Guard.

§ 172.01–5 *Assignment of functions.* (a) By Reorganization Plan No. 3 of 1946, effective July 16, 1946, the marine inspection functions of the former Bu-

reau of Marine Inspection and Navigation and its officers and employees were transferred to the Commandant, United States Coast Guard. By Reorganization Plan No. 26 of 1950, effective July 31, 1950 (15 F. R. 4935, 5 U. S. C. note under 241), the functions formerly vested in the Commandant, United States Coast Guard, were transferred to the Secretary of the Treasury with certain specified exceptions. The Secretary of the Treasury by an order dated July 31, 1950 (15 F. R. 6521), delegated to the Commandant the functions formerly performed by him under Reorganization Plan No. 3 of 1946.

§ 172.01–10 *Authority for regulations.* (a) The authority to prescribe regulations for the identification of undocumented vessels is in the Act of June 7, 1918, as amended (40 Stat. 602, as amended; 46 U. S. C. 288).

SUBPART 172.05—APPLICATION

§ 172.05–1 *General.* Section 1 of the act of June 7, 1918, as amended, states:

Every undocumented vessel operated in whole or in part by machinery, owned in the United States and found on the navigable waters thereof, except public vessels, and vessels not exceeding sixteen feet in length measured from end to end over the deck excluding sheer, temporarily equipped with detachable motors, shall be numbered.

§ 172.05–5 *Vessels required to be numbered.* (a) The following undocumented vessels are required to be numbered:

(1) All vessels equipped with permanently installed motors.

(2) All vessels over 16 feet in length equipped with detachable motors.

§ 172.05–10 *Vessels not required to be numbered.* (a) The following undocumented vessels are not required to be numbered:

(1) All vessels not exceeding 16 feet in length temporarily equipped with detachable motors.

(2) Sail vessels not equipped with auxiliary motors or sail vessels not exceeding 16 feet in length when equipped with detachable motors.

(3) Public vessels.

(4) Motor lifeboats carried as lifesaving equipment on inspected vessels.

(b) The words "temporarily equipped with detachable motors" shall be construed to mean outboard motors which are clamped or otherwise temporarily fastened as distinguished from outboard motors bolted or otherwise permanently secured. The controlling principle shall be whether or not the vessel has permanently installed motors rather than the design or construction of the vessel.

(c) Undocumented vessels listed in paragraph (a) of this section will not be numbered except upon instructions of the Commandant.

SUBPART 172.10—IDENTIFICATION REQUIREMENTS

§ 172.10–1 *Application for certificate of award of number.* (a) The owner(s) of any undocumented vessel however acquired, or his (their) duly authorized agent, shall make application for a certificate of award of number to the Coast Guard District Commander or Officer in Charge, Marine Inspection, having jurisdiction over the area in which the vessel is owned. If the boat is to be in the possession of a person other than the person who holds title thereto under a conditional sales or retain title contract or similar arrangement under which title does not pass, the application shall be made by the person(s) who holds legal title.

(b) Upon purchasing or acquiring a vessel which previously has been issued a certificate of award of number, and after completion of the bill of sale on the reverse side of the certificate of award of number (Form CG 1513) by the vendor or the former owner(s), the purchaser(s) will execute the application for number for undocumented motor vessel, which is incorporated on the reverse side of the certificate of award of number, and surrender the certificate, bill of sale, and application for a new number (which are all on Form CG 1513) to the Coast Guard District Commander or Officer in Charge, Marine Inspection, within the statutory period of 10 days.

(c) In the case of new vessels or in the case of vessels which have not been previously numbered or in the case of vessels which have been issued the old form of certificate of award of number (Form 1513), which does not contain the application, the owner(s) of the vessel or his (their) duly authorized agent shall make the application in duplicate for a number on Form CG 1512, application for number for undocumented motor vessel, and shall surrender this form, after completion, together with documentary evidence of ownership or the certificate of award of number with the bill of sale properly executed, to the proper Coast Guard District Commander or Officer in Charge, Marine Inspection.

§ 172.10–5 *Documentary evidence of ownership.* (a) The Coast Guard District Commander or the Officer in Charge, Marine Inspection, who receives the application for an award of number will satisfy himself that the applicant(s) has (have) legal title to the vessel. Any case in which ownership or legal title is in doubt will be referred to the Commandant.

(b) Original ownership may be proved by the purchase(s) as follows:

(1) Bill of sale; or,

(2) Receipted bills for material used in construction; or,

(3) Statement of reputable boat building concern signed by an owner, officer or duly authorized agent thereof that the boat was constructed for the applicant(s) in its factory or yard; or,

(4) Such other evidence of ownership as is acceptable to the Coast Guard District Commander or the Officer in Charge, Marine Inspection.

(c) In the case of any vessel sold as surplus property by the United States Maritime Administration or the former United States Maritime Commission or the former War Shipping Administration, the papers furnished the successful bidder in the form of a sale order or certificate of delivery of vessel, as the case may be, shall be accepted as sufficient evidence of ownership.

§ 172.10–10 *Issuance of certificate of award of number.* (a) Upon receipt of an application for a certificate of award of number, together with proof of ownership, the Officer in Charge, Marine Inspection, may assign a number, and may issue a letter, in lieu of the certificate, authorizing the undocumented vessel to be temporarily operated pending the issuance of the certificate. The Coast Guard District Commander will issue a certificate of award of number in all instances, except where he has designated and authorized officers or employees under his command to issue such certificates in his behalf.

§ 172.10–15 *Certificate of award of number kept on board undocumented vessel.* (a) The certificate of award of number for an undocumented vessel shall be kept on board at all times and shall be accessible to the person in charge except when such certificate is in the custody of the Coast Guard District Commander or the Officer in Charge, Marine Inspection. This requirement, however, does not apply to any vessel not exceeding 17 feet in length, measured from end to end over the deck, excluding sheer, nor to any vessel regardless of length if the design or fittings is such that the carrying of the certificate of number on board would render it imperfect, illegible or would tend to destroy its use as a means of ready identification.

(b) In the case where a letter is issued assigning a number previous to the issuance of a certificate of award of number, the new owner may operate such vessel without penalty for failure to have such certificate of award of number if the letter is carried and produced when necessary for identification.

(R. S. 5294, as amended, sec. 21, 54 Stat. 167; 46 U. S. C. 7, 526t)

§ 172.10–20 *Issuance of certificate of award of number to an alien.* (a) The provisions of section 37 of the Shipping Act, 1916, as amended (46 U. S. C. 835), apply to transactions with aliens during the national emergency and the requirements of the United States Maritime Administration also apply (see §§ 221.5 and 221.6 of this title). Therefore the issuance of a certificate of award of number to a vessel, the sale or transfer of which, in whole or in part, is subject to section 37 of the Shipping Act, 1916, as amended, will be made only if in accordance with the United States Maritime Administration's requirements.

SUBPART 172.15—NOTIFICATION OF CHANGES REQUIRED

§ 172.15–1 *Information required when changes occur.* (a) The owner(s) of a numbered vessel shall, within 10 days, notify the Coast Guard District Commander or Officer in Charge, Marine Inspection, who issued the certificate of award of number if:

(1) The vessel is lost, destroyed or abandoned. (See also paragraph (b) of this section); or,

(2) The vessel is transferred from one person to another. (See also paragraph (b) of this section); or,

(3) He (they) moves his (their) permanent residence. (See also § 172.15–5.)

(b) In the case of change of ownership, loss, destruction, or abandonment of a numbered vessel, the notice shall be

accompanied by a surrender of the certificate of award of number if it is in existence.

(c) When the owner(s) changes the name, service, or engine number of a numbered vessel, he (they) shall notify the Coast Guard District Commander who issued the certificate of award of number so that the records may be corrected, and, if necessary, issue a new certificate bearing the same number.

§ 172.15–5 *Procedure upon change of permanent residence.* (a) If the owner(s) has moved his (their) permanent residence to a place within the same Customs and Coast Guard districts the original number awarded will be retained by the vessel.

(b) If the owner(s) has moved his (their) permanent residence to a place in another Customs district or to a place in another Coast Guard district, the owner shall surrender the certificate of award of number to the Coast Guard District Commander having jurisdiction. The Coast Guard District Commander will issue a new certificate of award of number and will assign a new number in accordance with the Customs district or Coast Guard district in which the vessel is now owned, and will return the surrendered certificate of award of number to the Coast Guard District Commander who issued the certificate for proper disposition.

SUBPART 172.20—VESSEL IDENTIFICATION

§ 172.20–1 *Number assigned required on bow of undocumented vessel.* (a) Every undocumented vessel required to be numbered shall have the number awarded or assigned painted on or attached to each side of the bow so that the number reads from left to right. The number shall be located as high above the water line as practicable, but in no case less than 3 inches from the bottom of the numbers to the water line.

§ 172.20–5 *Style of numbers.* (a) The number shall be in block characters of good proportion, not less than 3 inches in height, and parallel with the water line as near the forward end of the bow as legibility of the entire number for surface and aerial identification permits.

§ 172.20–10 *Color of numbers.* (a) The numbers shall be of a color which will contrast with the color of the hull so as to be distinctly visible and legible; i. e., if the hull is light, the color of the numbers shall be dark, or if the hull is dark, the color of the numbers shall be light.

Dated: October 17, 1952.

[SEAL] A. C. RICHMOND,
Rear Admiral, U. S. Coast Guard,
Acting Commandant.

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